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# USSR Report

SCIENCE AND TECHNOLOGY POLICY

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## ORGANIZATION, PLANNING AND COORDINATION

## ROLE OF INNOVATORS IN MECHANIZING MANUAL LABOR

Moscow TRUD in Russian 30 Jun 84 p 2

[Article by Ye. Tyurin, chairman of the Central Council of the All-Union Society of Inventors and Efficiency Experts: "The Honorable Mission of Innovators"]

[Text] Without exaggerating it can be said that the mechanization of manual labor was and remains the most urgent problem of industry. There is an amazing thing: technology is moving ahead by 7-mile steps, a vast number of automatic machines, semi-automatic machines and manual power tools are being developed, but the urgency of the problem is not decreasing.

The state of affairs, in case of which in machine building--the most massive, most prolific area of production--the level of mechanization of auxiliary processes is nearly half as great as that of basic processes, can in no way satisfy us. What has been said applies to an even greater degree to construction, in which the proportion of manual labor, although having decreased in the past 10 years, remains too high. About 10 million people are also employed in loading and unloading operations.

Today this problem is especially urgent. Here, too, there is a constantly increasing percentage of young people, who are studying with leave from work. And there is the contradiction, which is being aggravated in this connection, between the high educational level of young people and the low degree of mechanization of manual operations: difficult labor, no matter how well paid it is, does not attract an educated person. The rapidly developing sphere of service, in which a significant portion of the able-bodied population is now employed, is noticeably diverting manpower, although in this sphere the increase of employment to a greater extent is also due to the poor mechanization of manual operations. Industry and agriculture are receiving fewer workers than required.

In the matter of decreasing the proportion of manual labor a responsible role has been assigned to inventors and efficiency experts. The mission of innovators is all the most honorable, as they should solve not only an economic, but also an urgent social problem. The freeing of workers from manual, difficult physical and monotonous labor, which does not require high skills, will enable hundreds of thousands of people to master new occupations

and to engage in labor which involves creativity. For 1981-1985 the task was posed to free in all nearly 2.5 million people for work at other works.

About 5 million inventions and efficiency proposals are submitted annually in the country. Owing to the joint efforts of economic organs, party and trade union organizations and councils of the All-Union Society of Inventors and Efficiency Experts, which are aimed at the enlistment of innovators in the solution of the problems of eliminating manual labor, the proportion of inventions and efficiency proposals in this area is increasing with each year. The All-Union Society of Inventors and Efficiency Experts, which has nearly 13 million members, is actively participating in the comprehensive goal program of trade unions on the reduction of manual labor, by organizing reviews and competitions and the competition of innovators. The organizations of the All-Union Society of Inventors and Efficiency Experts have acted as the initiators of a number of interesting initiatives. The experience of the innovators of the enterprises of Zaporozhye Oblast, forestry of Altay Kray and the Magnitogorsk Metallurgical Combine, where a significant increase of the production volumes was achieved without the additional attraction of manpower--owing to the extensive enlistment of inventors and efficiency experts in the solution of the problems of mechanizing manual labor--is being spread extensively. Last year owing to the mechanization of manual labor in the Ministry of Chemical and Petroleum Machine Building about 2,000 people were freed, in the Ministry of the Automotive Industry--7,000, in the Ministry of Instrument Making, Automation Equipment and Control Systems--24,000.

However, the study of the experience of the participation of the All-Union Society of Inventors and Efficiency Experts in the program of the reduction of manual labor showed that far from all the reserves have been used by us. The main obstacle in the way of mechanization is the slow introduction of innovations. The accounting, which was begun on the initiative of Ukrainian innovators and has been extended by the Central Council of the All-Union Society of Inventors and Efficiency Experts to other regions, of the inventions and efficiency proposals, which have been accepted for use and lie idle, showed that in the system of some ministries the ones of this kind amount to up to a third of the total number of those accepted. Some with time have lost their topicality. How is the introduction of innovations to be accelerated? How is the enormous creative potential to be used practically?

Practical experience has shown the great possibilities of creative associations of workers. In the country creative multiple-skill brigades now unite more than 1 million innovators, approximately 800,000 proposals, of which a large portion are mechanisms and devices for the reduction of manual labor, are introduced by them annually. At public design bureaus nearly 200,000 enthusiasts are actively taking part in creative technical work--this is 300,000 introduced innovations annually. In all 10,000 public patent bureaus are helping to select and register innovations and to recommend them for priority introduction, approximately a fourth of all the applications for inventions, which are submitted in the country, are drawn up by them.

But public creative associations have their own problems: the limitedness of the experimental bases, difficulties in material and technical supply, vague legal regulation, disputes over the system of the remuneration of the labor of

the members of these collective forms of creative work. They must be solved as quickly as possible.

Such creative associations as sections and shops of introduction as a voluntary service and creative laboratories of innovators are yielding reassuring results. For example, tens of automatic and semi-automatic machines, which have made it possible to free about 100 workers from manual labor, have been developed and introduced in the creative laboratory of the Cherkassy Plant of Telephone Equipment, which Honored Efficiency Expert of the Ukrainian SSR mechanic Z. N. Zaytsev manages. More than 100 plants of the country have requested the documents for items of this laboratory. The creative laboratory of Hero of Socialist Labor and Honored Efficiency Expert of the RSFSR G. I. Sergeyev, a member of the Presidium of the Central Council of the All-Union Society of Inventors and Efficiency Experts and a mechanic of the Kaluga Plant of Automotive Electrical Equipment, is working no less successfully. However, the experience of creative laboratories is being spread slowly, for the present their number in the country does not exceed 150.

The experience of setting up experimental shops and sections, in which it would be possible to produce mechanisms and devices for decreasing the proportion of manual labor at the enterprise, is also being assimilated slowly. The right of such associations to exist has been demonstrated by many collectives of enthusiasts. For example, at the Kemerovo Electrical Equipment Plant, where 1 person in 10 is an efficiency expert, the innovations, which were developed in the section of mechanization and automation, which Honored Efficiency Expert of the RSFSR E. Ya. Rullinkov manages, made it possible to free more than 100 people from manual labor.

The correct and skillful use of the set of measures of moral and material stimulation is of great importance for stepping up creative technical work. In his speech at the February (1984) CPSU Central Committee Plenum Comrade K. U. Chernenko directed attention to the need to improve the stimulation of the creative initiatives and innovation of workers. In addition to the usual measures of the stimulation of innovators for participation in the decrease of the proportion of manual labor, at many enterprises additional stimuli are envisaged in the form of bonuses, travel authorizations and valuable prizes. More and more often additional stimulation for active participation in the elimination of manual labor at the enterprise is being set down in collective contracts on the initiative of trade union committees and councils of the All-Union Society of Inventors and Efficiency Experts.

Another problem of the mechanization of manual labor is the comprehensive approach to its solution. Practical experience shows that the attempts to introduce individual mechanisms or devices in sections or workplaces decreases the effectiveness of important measures. What is the sense, if in the technological chain alongside a highly productive automatic machine manual labor, which reduces to naught the efforts to increase labor productivity, is being used? The councils of the All-Union Society of Inventors and Efficiency Experts should coordinate the efforts of innovators for the purpose of the comprehensive solution of problems. The experience of the Berezniki Titanium and Magnesium Combine, at which the innovators are working under the motto

"Complete mechanization for all production of titanium and magnesium," can serve as an example of this. At the combine the proportion of workers, who are engaged in manual labor, is the lowest in the sector, 95 percent of the loading and unloading operations are mechanized.

The innovators of the country are approaching the Day of the Inventor and Efficiency Expert with great achievements. The use of the technical innovations being developed by them annually provides the country with a saving of about 7 billion rubles. Inventions and efficiency proposals, which are aimed at the reduction of manual labor, make up a significant proportion among these innovations. In developing these automatic and semi-automatic machines, innovators are fulfilling a social order. The awareness of the responsibility to society and the importance of the mission assigned to them is inspiring inventors and efficiency experts to the development of new machines and automatic machines.

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## ORGANIZATION, PLANNING AND COORDINATION

### INCREASE OF TECHNICAL LEVEL OF PRODUCTION IN BELORUSSIAN INDUSTRY

Minsk NARODNOYE KHOZYAYSTVO BELORUSSII in Russian No 8, Aug 84 pp 4-8

[Article by Candidate of Economic Sciences B. Kobrikov, deputy chairman of the section "Regional and Sectorial Problems of Scientific and Technical Progress" of the Belorussian Republic Council of Scientific and Technical Societies and the Belorussian Republic Board of the Scientific Economic Society: "Scientific and Technical Progress: Rates, Stimuli, Management"; passages rendered in all capital letters printed in boldface in source]

[Text] The acceleration of the rate of scientific and technical progress and the use of its results in the national economy are the main source and a condition of the intensification of the economy of the republic and the increase of the efficiency of its social production. At the same time the opportunities available here are for the present being used far from completely. In this connection it is important to examine what the actual influence of scientific and technical progress on the increase of the efficiency of industrial production has been in recent year and what it might be in the future under the conditions of the intensive type of reproduction.

#### 1. Judge From the Result

It is well known: the end socioeconomic results and first of all the increase of labor productivity are the evaluation of the influence of scientific and technical progress on the efficiency of social production. In industry of the Belorussian SSR in recent years on the average approximately one-third of the growth has been provided by means of this factor. No doubt, it is impossible to regard such a result as adequate, especially as in individual sectors--for example, in machine building for animal husbandry and fodder production, in light industry, in the timber, pulp and paper and wood processing industry--the yield from the introduction of the achievements of scientific and technical progress is even lower. In all during 1981-1982 the growth of labor productivity in industry of the Belorussian SSR due to the increase of the technical level of production declined as compared with the 9th and 10th Five-Year Plans (see the table). This also affected the overall rate of its increase.

Years	1975	1980	1981	1982
Increase of labor productivity due to the increase of the technical level of production, percent	2.3	2.1	1.7	2.0
Relative decrease of number of workers, thousands	28.8	30.6	24.4	27.5
Expenditures on increase of the technical level of production, millions of rubles	295.2	320.2	308.2	351
Effectiveness of expenditures: <u>relative decrease of number of workers</u> <u>millions of rubles</u>	100	79	79	78

Now let us take the profit, which the technical level of production also influences, although not to such an extent. And here this influence is weakening. Thus, whereas in 1980 an additional profit of 149.2 million rubles was obtained due to the increase of the technical level of production, during 1981-1982 it was a little more than 133 million rubles.

The decrease of the proportion of the additional profit from the decrease of the production cost and the increase of product quality, which was obtained from the introduction of measures on the increase of the technical level of production, is also occurring. Thus, in 1975 it came to 4.1 percent, in 1980--3.8 percent, while in 1982--already only 3.5 percent, which it is in no way possible to recognize as a normal regularity. This proportion should be stable and come to not less than 4 percent of the total amount of profit.

At present one of the evaluation indicators of the effectiveness of measures of scientific and technical progress is the impact from their introduction. Unfortunately, the different procedural approach to its calculation in different ministries does not make it possible to obtain a reliable figure. Thus, the impact as a whole for industry of the Belorussian SSR in 1982 come to 148 million rubles, while the additional profit from the decrease of the production cost came to only 134 million rubles, although here 318 million rubles were spent on the implementation of measures. If we calculate the impact in accordance with the procedural recommendations, it should be less than the sum of the decrease of the production cost by the amount of the adjusted expenditures. In this example it should come to 86 million rubles. If such an indicator as the impact from introduction is used later, it should be calculated in the same way for all enterprises.

At the same time THE EFFECTIVENESS OF EXPENDITURES CAN ALSO BE CALCULATED IN A DIFFERENT WAY--BY HOW MUCH ADDITIONAL PROFIT THERE IS PER RUBLE OF EXPENDITURES WHICH HAVE BEEN INVESTED IN THE INCREASE OF THE TECHNICAL LEVEL OF PRODUCTION. Such an indicator is simple, but the main thing is that it makes it possible to link the expenditures and the end result--the decrease of the production cost and the additional increase of the profit. At present the coefficient of 0.6-0.7 could be the standard for the efficiency of new equipment and technology for industry of the Belorussian SSR as a whole. In case of a level of expenditures on the increase of the technical level of



production of 350 million rubles, it would be possible to derive a profit of 210-245 million rubles, that is, 1.5-fold more than in recent years.

Scientific and technical progress is achieved in production through individual technical measures. More than 30,000 of them are introduced annually at all the enterprises of the republic. But minor measures, which have little influence on the end results, predominate in the total number of measures. In reality the dispersal of expenditures is occurring. Now there are about 9,000 rubles per measure on the increase of the technical level of production. But in 1975 there were 10,700 rubles. The number of major, comprehensive measures, which, as a rule, yield great efficiency, is not increasing.

The fact that basic production accounts for a significant number of introductions, also attracts attention. Ancillary production is being mechanized and automated slowly, although nearly half of the workers work there and the effectiveness of the introduction of the achievements of scientific and technical progress in this area is greater than in basic production.

Scientific and technical progress is also called upon to solve the problem of increasing the quality of the output being produced. In the past 8 years the volume of production of products of the highest category increased from 10.6 to 26 percent of the total output. And this occurred mainly due to high product quality at enterprises of union subordination. At enterprises of union republic ministries the products of the highest quality category in 1982 amounted to a little more than 10 percent, and their growth rate in recent years has been very low. Figures once again confirm the well-known truth: the high quality of a product is its technical and economic level.

Meanwhile, even in such a leading sector of the republic as machine building only 12 percent of the models of new equipment conform to the level of the best foreign and domestic analogues, 78 percent are at the level of only the best domestic items, while the technical level of 10 percent of the products has not been established at all. This testifies that it is necessary to approach more demandingly the planning of the long-term technical and economic parameters of new products. THE EVALUATION OF THE TECHNICAL LEVEL OF NEW MACHINES AND EQUIPMENT SHOULD BE MADE FROM THE STANDPOINT OF THE USER, THAT IS, IT SHOULD BE TAKEN INTO ACCOUNT, WHAT INCREASE OF LABOR PRODUCTIVITY THEY WILL PROVIDE HIM, BY HOW MUCH THEY WILL DECREASE THE COST OF THE WORK BEING PERFORMED AND WILL IMPROVE THE WORKING CONDITIONS OF THE WORKERS. WHEN EVALUATING CONSUMER GOODS THE DEMAND OF THE POPULATION, WHICH CAN BE CHARACTERIZED BY THE AMOUNT OF STOCKS IN TRADE, SHOULD BE REGARDED AS OF PARAMOUNT IMPORTANCE.

The competitive ability of the products being produced depends directly on the increase of their technical level. Let us compare the quantity of export products in the total volume of their output with respect to the leading machine building ministries. Thus, whereas in 1981 the enterprises of the Ministry of Machine Building for Light and Food Industry and Household Appliances exported 21.6 percent of the products being produced, the enterprises of the Ministry of Machine Building for Animal Husbandry and Fodder Production exported only 1.3 percent, while those of the remaining

ministries exported from 3 to 6 percent. The proportion of exports with respect to individual most important types of machines and equipment is even more uneven. In machine tool building slotting machines (the proportion of exports is 36.5 percent) and planing machines (24 percent) were most competitive. Then follow broaching and cutting-off machines--10 percent. Grinding, tool-grinding and standard-unit machines almost were not exported. As to consumer goods, here the picture is quite mixed. Whereas the level of exports of household refrigerators is stably high (30-35 percent), the exports of wristwatches of Belorussian enterprises come to only about 3 percent.

The increase of the degree of the mechanization of labor and of the decrease of the proportion of workers, who are engaged in manual labor, is the most important result of the introduction of the achievements of scientific and technical progress. In republic industry the degree of the mechanization of labor from 1975 to 1982 increased from 50.5 to 54 percent, moreover, in basic production from 67.1 to 74.8 percent, while in ancillary production from 27.5 to 33.6 percent. It should be noted that, in spite of the urgency of the problem of rapidly decreasing the use of mechanization of manual labor, the rate of its mechanization is not increasing. This is occurring primarily due to the increase of the number of those engaged in the repair and adjustment of equipment. The proportion of manual labor in republic industry from 1975 to 1982 decreased from 49.5 to 46 percent, that is, declined on the average by only 0.8 percent a year. The gap in the level of the mechanization of basic and ancillary production during this period increased.

The instability by years of the basic indicators of the effectiveness of scientific and technical progress (the increase of labor productivity; the increase of the additional profit, the decrease of the proportion of workers engaged in manual labor; the effectiveness of expenditures) attests to the low level of the management of scientific and technical progress in the republic.

WITH ALLOWANCE MADE FOR THE REAL SITUATION, FOR THE NEXT FIVE-YEAR PLAN IT IS POSSIBLE TO ESTABLISH FOR INDUSTRY OF THE BELORUSSIAN SSR THE FOLLOWING REFERENCE POINTS:

TO OBTAIN AN ANNUAL INCREASE OF LABOR PRODUCTIVITY DUE TO THE INCREASE OF THE TECHNICAL LEVEL OF PRODUCTION OF NOT LESS THAN 2.5-3 PERCENT;

TO PROVIDE ANNUALLY AN ADDITIONAL INCREASE OF THE PROFIT FROM THE DECREASE OF THE PRODUCTION COST AND THE INCREASE OF PRODUCTION QUALITY OF 240 MILLION RUBLES;

TO DECREASE THE PROPORTION OF WORKERS ENGAGED IN MANUAL LABOR BY 1-1.5 PERCENT A YEAR;

TO INCREASE THE PROPORTION OF PRODUCTS OF THE HIGHEST QUALITY CATEGORY IN THE TOTAL PRODUCTION VOLUME BY NOT LESS THAN 1 PERCENT ANNUALLY;

TO ACHIEVE AN EFFECTIVENESS OF EXPENDITURES ON THE INCREASE OF THE TECHNICAL LEVEL OF PRODUCTION OF NOT LESS THAN THE STANDARD OF 0.7.

THESE SPECIFIC REFERENCE POINTS WOULD ALSO MAKE IT POSSIBLE TO ELABORATE MORE PURPOSEFULLY SUGGESTIONS ON THE IMPROVEMENT OF THE SYSTEM OF THE MANAGEMENT OF SCIENTIFIC AND TECHNICAL PROGRESS IN THE REPUBLIC FOR THE ACHIEVEMENT OF THE SET GOALS, THAT IS TO USE THE GOAL PROGRAM APPROACH.

## 2. It Depends on the Form

Before talking about specific suggestions on the improvement of the system of the management of scientific and technical progress in the republic, it is necessary to analyze, through what forms of the interaction of production and science the achievements of scientific and technical progress are realized and how management influences them.

The specific nature of the management of scientific and technical progress in the republic should be noted--on the territory of the Belorussian SSR there are 1,172 industrial enterprises, which belong to 22 union, union republic and republic ministries and departments. The union ministries are represented by works which are different in size. These are both large scientific production associations and individual small enterprises. The republic ministries, although directly subordinate to the Belorussian SSR Council of Ministers, in the pursuit of technical policy depend on the corresponding union ministries. Moreover, the republic has a large scientific potential. On 1 January 1982 in the Belorussian SSR there were 78 scientific research institutes, 33 higher educational institutions, 17 affiliates and departments of scientific research institutes and 9 scientific and experimental stations. Each of the listed facilities requires specific methods of management. But all the forms and methods of influence should be aimed at the accomplishment of a twofold task--the increase of production efficiency in the republic and in the country as a whole by the increase of the level of the equipment and machines being produced and the level of the scientific developments, which are being carried out in the republic and are being implemented outside it.

Let us dwell first on the increase of the efficiency of industrial production by the introduction at enterprises of specific technical measures. It is possible to divide these measures into the following groups: those elaborated and introduced by the forces of the enterprises and departments themselves; those elaborated and introduced jointly with scientific subdivisions of the Belorussian SSR Academy of Sciences and the Belorussian SSR Ministry of Higher and Secondary Specialized Education and with sectorial institutes; those elaborated and introduced in accordance with republic scientific and technical programs, including by the development of republic intersectorial works. If we compare the results of the individual forms of the realization of scientific and technical progress, we will see that the scientific subdivisions of the republic as a whole obtain an approximately 1.5-fold greater impact than do all the industrial enterprises of the republic. This is explained by the fact that the Belorussian SSR Academy of Sciences, the Ministry of Higher and Secondary Specialized Education and sectorial institutes and organizations obtain a significant portion of the impact (70, 50 and 80 percent respectively) outside the republic. The conclusion is obvious: the possibilities of the influence of the scientific potential of the Belorussian SSR on republic industry are being used far from completely.



During the past five-year plan the formulation of scientific and technical goal programs and the special-purpose introduction of the most important achievements of scientific and technical progress became widespread. According to some estimates the implementation of scientific and technical programs in the national economy of the republic provides 70 percent of the impact. However, this figure is obviously too high, because they also classify as scientific and technical programs the republic comprehensive goal programs, such as "Labor," "Quality" and "Consumer Goods," which either encompass entire sections of the plan of the increase of the technical level of production (like "Quality") or in general duplicate this plan (like the program "Labor"). Here the basic principle of the distinction of programs: the concentration of forces and expenditures on individual important and effective directions, is violated.

Planning workers took the path of encompassing the entire diverse process of scientific and technical progress. This also affected the possibilities of the management of such programs. For example, during the first half of last year neither the program "Labor" nor the program "Quality" was fulfilled with respect to the basic goal indicators. It is hardly advisable to include in the future in the list of republic scientific and technical programs comprehensive goal programs, which in their essence duplicate the sections (or the entire plan) of the increase of the technical level of production as a whole for the republic and are in reality information, and not scientific and technical programs. For the result of scientific and technical programs is new machines and equipment, a new processing method or a plan of the reorganization of some object.

In the ratio of the individual forms of the implementation of the achievements of scientific and technical progress for industry of the Belorussian SSR as a whole developments in accordance with the plans of their own ministries provide approximately 70 percent of the total impact, economic contractual operations provide one-fifth and developments and the introduction of measures of the republic scientific and technical programs provide only 10 percent. The total amount of the impact was obtained on the basis of the reports of enterprises on form 10-NT, while the breakdown was derived from the reports of scientific subdivisions on the obtained annual impact at enterprises of the Belorussian SSR and from the data of the Belorussian SSR State Planning Committee on the impact of the implementation of the programs. But the data, which were taken from different forms of reports, required the additional analysis of the primary reporting materials on the introduction of measures on the increase of the technical level of production directly at enterprises and in the ministries. Meanwhile, taking into account the importance of such information for directive organs, THE BELORUSSIAN SSR CENTRAL STATISTICAL ADMINISTRATION SHOULD INDICATE IN STATISTICAL REPORTS (10-NT), BY MEANS OF WHAT FORM OF THE IMPLEMENTATION OF MEASURES ON THE INCREASE OF THE TECHNICAL LEVEL OF PRODUCTION THE IMPACT WAS OBTAINED.

Today, unfortunately, there are no accurate data on the influence of scientific organizations on the end results of production. But as it is it is obvious that for the present it is inadequate, it must be increased. CALCULATIONS SHOW THAT EVEN A NEGLIGIBLE INCREASE OF THE EXPENDITURES ON OPERATIONS, WHICH ARE PERFORMED JOINTLY WITH SCIENTIFIC SUBDIVISIONS, CAN LEAD

TO AN INCREASE OF THE TOTAL AMOUNT OF THE IMPACT BY NEARLY TWOFOLD. This stems from the fact that the effectiveness of the operations, which are performed by scientific subdivisions, on the average is several times greater than of those which are performed by enterprises themselves, since the former are based on new scientific and technical knowledge. The effectiveness of measures on the republic scientific and technical programs is also two- to threefold greater, since they, as a rule, include important effective developments.

THUS, FOR THE SIGNIFICANT INCREASE OF THE EFFECTIVENESS OF EXPENDITURES ON THE INCREASE OF THE TECHNICAL LEVEL OF PRODUCTION IN THE FUTURE IT IS NECESSARY TO REORIENT SCIENTIFIC ORGANIZATIONS SOMEWHAT IN THE DIRECTION OF THE DEVELOPMENT AND INTRODUCTION OF ECONOMIC CONTRACTUAL OPERATIONS WITHIN THE REPUBLIC. THIS ESPECIALLY CONCERNS THE BELORUSSIAN SSR ACADEMY OF SCIENCES AND SECTORIAL INSTITUTES. THE REPUBLIC, IN ALLOCATING ASSETS AND SKILLED PERSONNEL FOR THE DEVELOPMENT OF SCIENCE, HAS THE RIGHT TO REQUIRE GREATER ATTENTION OF THE LATTER TO ITS NEEDS.

### 3. Let Us Take a Look by Directions

About 30,000 measures, which differ both in aims and in the scale, the level of novelty and effectiveness, are introduced annually at industrial enterprises of the republic. Under the conditions of limited expenditures it is very important to break down the assets by directions so as to obtain the maximum yield and to observe the comprehensiveness of the development of the entire production system.

At present the following structure of the breakdown of expenditures by basic directions of the increase of the technical level of production has formed: republic enterprises allocate nearly half of the assets for the introduction of advanced technology, approximately 15 percent for the mechanization of production, 10 percent each for its automation and the assimilation of new types of products, 5 percent for the introduction of computer technology and less than 2 percent for the modernization of equipment. PRACTICAL EXPERIENCE SHOWS, AND AN ECONOMIC ANALYSIS CONFIRMS, THAT SUCH A STRUCTURE IS FAR FROM OPTIMAL. IT IS NECESSARY TO OPTIMIZE IT. THIS WOULD MAKE IT POSSIBLE DURING THE 12TH FIVE-YEAR PLAN TO DERIVE A PROFIT OF 240 MILLION RUBLES A YEAR FROM THE DECREASE OF THE PRODUCTION COST AND TO CONDITIONALLY RELEASE 40,000 PEOPLE.

In our opinion, there is a need to link the plan of the increase of the technical level of production by individual directions with the republic scientific and technical programs, having encompassed as a whole in so doing all the directions so that not less than 30 percent of the impact would be obtained due to the implementation of the programs. At present of the 13 republic scientific and technical programs 8 have as a goal the introduction of advanced technology, 3--the introduction of new types of products and the increase of quality, 1--automated control systems and 1--the automation of production. Its mechanization, as well as the modernization of equipment have not been touched at all. This testifies to the poor study of the list of republic scientific and technical programs.

The introduction of advanced technology in the future will also remain the leading direction of the increase of the technical level of production. The complete retooling of production is occurring on its basis, and the expenditures on this direction will constantly amount to half of all the assets. IT IS NECESSARY, HOWEVER, TO INCREASE THE EFFECTIVENESS BY NOT LESS THAN 60 PERCENT. This is not that much, if you consider that in 1980 republic industry had already reached nearly such a level of effectiveness in this direction. How is this to be achieved? It is necessary first of all to develop in every possible way intersectorial works--forging, founding, tool making, as well as powder metallurgy, which are based on the most advanced technology. This will sharply reduce the cost of the production of parts, will increase labor productivity and will save materials. By the end of the 12th Five-Year Plan intersectorial works as a whole should provide not less than 10 percent of the total amount of the economic impact.

At present the mechanization of production remains one of the most effective directions. And still, in spite of the fact that mechanization contributes significantly to the increase of labor productivity and the decrease of manual operations, in the republic little attention is being devoted to it. This is eloquently confirmed if only by the fact that with respect to this direction we do not have one republic scientific and technical program. Need one be amazed at the large number of shortcomings in this most important matter?

Let us dwell on the two basic ones. First, the mechanization of production is being carried out incompletely, mainly by the introduction of individual new machine tools, machines, instruments and equipment. Thus, in 1982 in this direction 8,200 units of equipment were introduced and only 2,500 pieces were incorporated in mechanized lines (30 percent). The proportion of the equipment, which is installed in mechanized lines, in practice is not increasing. Second, insufficient attention is being devoted to the mechanization of auxiliary, loading and unloading and warehousing operations, which is responsible for the slow rate of decrease of the number of workers employed there. Meanwhile it is well known that the mechanization of auxiliary operations is two- to threefold more effective than the mechanization of basic production processes. THAT IS, IF 20-30 PERCENT OF ALL THE EXPENDITURES ARE SHIFTED TO THE MECHANIZATION OF AUXILIARY OPERATIONS, IT IS POSSIBLE TO OBTAIN FOR THE REPUBLIC AS A WHOLE AN ADDITIONAL GAIN OF 15-20 MILLION RUBLES AND TO INCREASE THE EFFECTIVENESS OF THE DIRECTION BY 20 PERCENT. For the acceleration of this trend in the republic special scientific production associations for the mechanization of auxiliary operations should be set up, having earmarked for this 1,000-1,500 workers and having built a pilot plant with the proportionate participation of enterprises. This would make it possible to introduce in ancillary production means of mechanization worth approximately 10 million rubles.

The problem of the yield from introduced means of automation also remains urgent. It is nearly half as much as on the average for all directions. How is this explained? First of all by their high cost, the low utilization and low reliability of automatic equipment. According to the data of statistical organs, of the 300 automatic lines, which are installed at machine building enterprises of Minsk, only 9 percent operate more than 2 shifts, only half have been brought up to the design capacity. Matters are even worse with the



use of machine tools with programmed control. The shift coefficient of this highly productive equipment is less than the average for all machine tools, while the load factor does not exceed 0.6-0.7. The machining of parts on NC machine tools takes up 10-12 percent of the nominal time of their operation, while the tool operates only about 3 percent of this time.

Of course, we should dwell specially on such a direction of automation as the introduction of robotics. A special program, which is aimed at the sharp increase at enterprises of the number of robots and automatic manipulators (from 200 units in 1980 to 2,000 units in 1985), is being implemented in the republic. As a whole quantitatively the program is being fulfilled, which it is impossible to say, unfortunately, about its effectiveness. The pursuit of quantity often takes place to the detriment of the quality of introduction. That is, robots are being introduced incompletely, and this also decreases sharply the effectiveness. In reality, for the present they are obtaining the desired results only at the Minsk Timepiece Plant and at the Integral Production Association. At the other works robotics, as a rule, is unprofitable. It is quite obvious that in the future more attention should be devoted to the socioeconomic results of robotization, while its quantity should not be pursued. Here it would not hurt to clearly understand what we mean by "robotics." That is, where we have robots and where we have automatic manipulators. This will make it possible to evaluate the situation sensibly and to outline specific suggestions on this direction.

In the matter of increasing the technical level of production, it would seem, the development of automated control systems should yield the greatest impact. But for 15 years now this direction, which is based on the most advanced science, has remained the most ineffective. Every ruble, which is invested for these purposes, yields only 16 kopecks, which is a third as much as in other directions. Of course, it cannot continue further this way. Whereas previously the designers of automated control systems could cite the lack of highly skilled personnel for the development, introduction and operation of computer equipment, now the national economy has trained a significant number of such specialists. It is time to hold more strictly accountable those who are responsible for the efficient use of the vast assets being allocated. For during the current five-year plan 115 million rubles have been allotted for this, while it is planned to obtain an impact of only 47 million rubles. APPARENTLY, COMPETENT ORGANS NEED TO BEGIN MAKING AN APPRAISAL OF THE LARGEST AUTOMATED CONTROL SYSTEMS, WHICH ARE BEING INTRODUCED IN THE REPUBLIC, AND TO TIGHTEN UP THE MONITORING OF THE QUALITY OF THEIR DEVELOPMENT.

And, finally, about such a direction of the increase of the technical level of production as the modernization of equipment. At present in industry of the Belorussian SSR the average "age" of equipment comes to 15 years, more than 15 percent of the total number of installed machine tools have been operating for more than 20 years. All this is not conducive to the increase of production efficiency. Meanwhile, the annual replacement of obsolete metalworking equipment is being carried out within the range of 2-3 percent of the available stock, while the advanced norms are equal to 6-8 percent. At the same time it should be taken into account that the mass replacement of obsolete machinery given the enormous capacities of equipment would absorb many years of the output of products of machine tool building. Precisely for

this reason at present emphasis on the modernization of equipment is advisable.

It is necessary to increase of the effectiveness of the measures on modernization primarily by two means: first, by modernizing the equipment of "bottlenecks" and, second, by organizing the modernization of metal-cutting equipment at the producer plants. In this connection the foreign experience of buying up and modernizing used equipment merits attention. For example, a number of firms willingly buy or accept for modernization machines which were previously produced by them, either by restoring the initial parameters of the equipment or by bringing it up to the level of the latest models. It seems that such experience of updating the production potential also deserves extensive dissemination in our machine building. For its accomplishment within the republic it would be advisable in accordance with an understanding with the USSR Ministry of the Machine Tool and Tool Building Industry to establish at Belorussian machine tool plants a specific special-purpose reserve of capacities. As for forge and press equipment and foundry equipment, the dismantling and transportation of which involves certain difficulties, it is possible to establish specialized mobile field service subdivisions resembling the multiple-skill brigades which exist in the chemical industry. The formulation of technical policy in the area of the modernization of forge and press machines and foundry equipment, of course, should be assigned to the producer enterprises, while the brigades should be charged with its implementation at the enterprises, where this equipment is being used.

The assimilation of new types of products is the most important reserve of the increase of production efficiency. As the analysis shows, not all the equipment, which is planned for production during the 12th Five-Year Plan, is efficient enough to achieve high end results. Thus, whereas some trucks of the MAZ family make it possible to decrease operating costs by 18.3 percent, the MAZ-5551 dump truck provides an increase of labor productivity as compared with the model being replaced by only 5 percent. A new model of a tractor (MTZ-100/102) decreases the cost of agricultural operations by only 3 percent and increases productivity by 10-15 percent. The new KSK-100A-1 fodder harvester also has a negligible increase of labor productivity. This is at our leading enterprises. And what is to be said about the others?

As a rule, all our machine building products are much heavier than analogous foreign models. And it is not surprising. At the enterprises they make a comparison with these analogues only with respect to the technical parameters, without comparing at all the cost of the operations being performed. As we see, there are also many shortcomings in this direction of the increase of the technical level of production.

#### 4. From the Point of View of Territory

The decree of the CPSU Central Committee and the USSR Council of Ministers on the improvement of the economic mechanism, which was adopted 5 years ago, envisages the further intensification of the combination of the sectorial and territorial principles of the management of the economy. Since then republic organs have stepped up appreciably their activity in the formulation and the

monitoring of the progress of the implementation of republic scientific and technical programs, the certification of plans of the renovation of industrial enterprises, the production of consumer goods, the tightening up of discipline and the evaluation of the practical qualities of management personnel. At the same time there are still many opportunities to increase the influence of republic organs on the acceleration of the rate of scientific and technical progress in industry of the region.

The efficiency of management in many ways is governed by the improvement of planning. The analysis of the plans of the improvement of the technical level of production, beginning with republic and ministerial plans and ending with plans of enterprises, shows their poor orientation toward the end results and inadequate interconnection. Here is an example. In the Belorussian SSR Ministry of the Food Industry according to the long-range plan last year the relative staff reduction due to the increase of the technical level of production should have come to 490 people, according to "The Draft of the Five-Year Plan"--835, but according to the adjusted plan of the ministry came to only 395. It is also possible to detect such a disparity with respect to other indicators. And not only in the Ministry of the Food Industry.

There is another thing. Everyone knows that a strict connection exists between the expenditures and the results, but in the plans such a dependence is poorly traced. Take the same Ministry of the Food Industry. Given the lowest level of expenditures in 1982--5.84 million rubles--it was planned to obtain an increase of the profit by 1.3 million rubles and to reduce the staff by 520 people, while this year with expenditures of 7.06 million rubles the increase of the profit is remaining, it can be said, at the same level, it is proposed to reduce the staff by only 410 people. The cited examples testify to the poor methodological study of the plans--that is, the decree of the CPSU Central Committee and the USSR Council of Ministers on the improvement of the economic mechanism, in which the task is posed to change over to the standardized method of planning, is not being fulfilled. On the other hand, it seems that republic planning organs should display greater persistence in defending their elaborations before union and union republic ministries and not allow their downward adjustment. Apparently, they should also think about how to effectively influence these ministries. For the union and union republic ministries now account for 60 percent of the increase of labor productivity and the additional profit from the increase of the technical level of production.

FOR INCREASING THE SCIENTIFIC LEVEL OF THE PLANNING OF THE INCREASE OF THE TECHNICAL LEVEL OF PRODUCTION A COMPREHENSIVE PLAN OF HIGH END RESULTS--THE INCREASE OF LABOR PRODUCTIVITY, THE DERIVATION OF AN ADDITIONAL PROFIT, THE DECREASE OF THE PROPORTION OF MANUAL LABOR AND THE INCREASE OF THE VOLUMES OF PRODUCTION OF PRODUCTS OF THE HIGHEST QUALITY CATEGORY--SHOULD BE DRAFTED FOR THE 12TH FIVE-YEAR PLAN. This plan should have a breakdown by ministries and departments, large production associations and enterprises of union subordination and by the basic directions of the implementation of measures of technical progress and should be coordinated with the forms of the implementation of scientific developments. Such a plan would make it possible to increase significantly the role of republic organs in the monitoring of the status, approval and fulfillment of the assignments by individual enterprises



and scientific subdivisions. In this case the republic State Planning Committee would not derive the overall figure on the basis of the data of individual organizations, but would itself sent to them assignments, which have been coordinated with high end results.

THE PLANS OF THE INCREASE OF THE TECHNICAL LEVEL OF PRODUCTION SHOULD BE CLOSELY COORDINATED WITH THE REPUBLIC SCIENTIFIC AND TECHNICAL PROGRAMS, WHICH ENVISAGE THE SOLUTION OF THE MOST IMPORTANT AND EFFECTIVE PROBLEMS OF SCIENTIFIC AND TECHNICAL PROGRESS IN ALL DIRECTIONS. There should be not less than five of them for each of the important directions, such as the introduction of advanced technology, the mechanization and automation of production and the assimilation of new types of products, while there should be two or three programs for the remaining directions (the introduction of computer technology, modernization and other measures). Thus, as a whole there should be not less than 30-40 programs. Such an approach will make it possible to increase the soundness of the plans, will back their implementation and will aim republic directive organs at the monitoring of the most effective and and comprehensive problems of scientific and technical progress in the republic.

Within the comprehensive plan of the increase of the technical level of production it is also necessary to stipulate clearly, what end results should be obtained due to the economic contractual operations, which have been performed by the Belorussian SSR Academy of Sciences, its institutes, the Belorussian SSR Ministry of Higher and Secondary Specialized Education and sectorial institutes.

Of course, industry should be prepared for the introduction of advanced equipment and technology and for direct broad ties with science. At present the extensive introduction of developments is being checked by the fact that it is of no interest to academic institutes and large chairs of higher educational institutions to conclude economic contractual operations with small and even medium-sized enterprises. In order to realize the potentials of science it is necessary to begin more rapidly the elaboration of a version of the significant concentration and specialization of production. This will make it possible to increase sharply the level of management of industry on the part of republic organs, which now go directly to 630 enterprises of union subordination and to union ministries.

The formulation of the republic comprehensive goal program "The Concentration and Specialization of Industrial Production and Science of the Republic" should become the first step in the implementation of this suggestion. The utmost development of intersectorial works should be envisaged within this program.

The concentration and specialization of production will also make it possible to solve another important organizational problem--to set up republic intersectorial scientific production centers as a voluntary service, which unite enterprises with scientific organizations and organizations of higher educational institutions into a unified complex. The experience of the operation of such centers in the country testifies to the great effectiveness of this form of the integration of science and production. On the basis of

large scientific production associations, the institutes of the Belorussian SSR Academy of Sciences, the faculties of higher educational institutions and sectorial institutes it is necessary to develop a network of such complexes and to see how the structural organization of science can help individual subsectors of industry and what the disproportions here are. It is now already possible to say that such disproportions exist, and they are large. The themes of a number of laboratories of academic institutions, chairs of higher educational institutions and sectorial institutes cover far from completely all the directions of the increase of the technical level of production in the most important subsectors, a number of works to this day have not received the attention of science. A PLAN OF THE NETWORK OF INTERSECTORIAL SCIENTIFIC PRODUCTION COMPLEXES WITH THEIR ATTACHMENT TO BASIC WORKS SHOULD BE DRAFTED WITHIN THE REPUBLIC COMPREHENSIVE GOAL PROGRAM "THE CONCENTRATION AND SPECIALIZATION OF PRODUCTION AND SCIENCE OF THE REPUBLIC."

The most significant shortcomings in the system of the management of scientific and technical progress, in our opinion, appear in the methods of the stimulation of scientific and production organizations, engineers and scientists. In recent years a plan on the increase of production efficiency due to technical progress has begun to be reported to enterprises and associations. However, not one manager has yet suffered because of its nonfulfillment, although there are many such cases. Or take scientific subdivisions, to which a plan on efficiency, including on the obtained impact from developments in production, is sent. For most often it is evaluated according to individual results, and not according to introduction.

The evaluation of the labor of engineers, scientists and managers is also poorly linked with the end results with respect to the increase of production efficiency. In the total amount of the wage the salary, which reflects the skill of performers, but in no way his actual contribution to the end results, takes up an overwhelming proportion. The bonus for the introduction of new equipment comes to several rubles a month per engineering and technical worker and, as a result, does not prompt them to increase the efficiency of new equipment and production.

The same thing can also be said about scientists, whose wage first of all is determined by the academic degree and title. The payment for a fulfilled and introduced development in reality is insignificant. Is it not for this reason that many scientists do not hurry to implement the started projects which they have?

Everything said forces us to think about the radical reform of the evaluation and stimulation of the labor of engineering and technical personnel and scientists. IT SEEMS THAT IN THE REPUBLIC IT WOULD BE TIME TO BEGIN AN EXTENSIVE EXPERIMENT ON THE IMPROVEMENT OF THE REMUNERATION OF THEIR LABOR. At enterprises it should be made dependent on the specific contribution of engineering and technical personnel to the increase of production efficiency, that is, for the additional profit and the freed workers. In scientific subdivisions it is necessary to change over to collective forms of payment for the end result, that is, at first only to advance money to a development, and to make final settlement only after its introduction.

The end results of scientific and production collectives with respect to the increase of production efficiency in many ways depend on the organizing abilities of their managers. Apparently, one should more strictly evaluate the activity of managers and analyze their work, on the basis of the achieved and standard results. It is possible to carry out such an evaluation, having organized the extensive certification of the economic managers, who are responsible for development and the introduction of the achievements of scientific and technical progress in production.

The improvement of the management of scientific and technical progress in the republic is a multifaceted process which requires a systems approach. However, in all the diversity of problems it is necessary to distinguish the main ones, which more than others influence the end result--these are first of all the improvement of the methods of planning and stimulation, the reform of the organizational structure of production and the management of science in the republic. In concluding the discussion, I would like to stress that it is necessary to solve them in combination, as a system.

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## ORGANIZATION, PLANNING AND COORDINATION

### CONTRACTUAL RELATIONS IN DEVELOPMENT OF NEW EQUIPMENT

Moscow KHOZYAYSTVO I PRAVO in Russian No 9, Sep 84 pp 31-34

[Article by Candidate of Economic Sciences M. Zolotarev and V. Lebedev, chief of a department of the All-Union Scientific Research and Design Institute for Equipment for the Tire Industry: "In Case of the Development of New Equipment"]

[Text] The fulfillment of the program in the area of scientific and technical progress in conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," which was adopted in 1983, in many ways depends on the extent to which the interrelations between the participants in the development of new equipment are economically sound and are regulated by the norms of the law.

The developer organization concludes a contract for the development of machines and equipment or receives a supply order for the entire amount of work. On the basis of the content of the theme, its production possibilities and specialization it enlists as coperformers on the basis of contracts other, as a rule, narrowly specialized production, scientific research and planning and design organizations. The activity of the latter might not have a direct bearing on the development of new equipment, but might be confined, say, to the drawing up of documents. Thus, the content of the work of the basic developer and the coperformers differs substantially. However, this is not always taken completely into account in the contracts between the named organizations, which adversely affects the fulfillment of the assumed obligations. The joint activity of several participants is widespread in capital construction, when the relations between the client, the general contractor and specialized organizations are regulated by a master contract and subcontracting agreements. They differ substantially in content and the sphere of activity, the rights and duties of the parties are clearly specified in them.

In the area of the development of new equipment such a division in contracts so far does not exist. However, the subject of the agreement of the main developer of the new equipment with the clients, on the one hand, and the organizations being enlisted as coperformers, on the other, has essential differences. In the former case this is a completed type of new product,

while in the latter this is individual types of operations, assemblies and components, which belong to it.

The nature of the work being performed dictates the need for the establishment of the composition of the participants in the development of new equipment, which finds reflection in a special document--the schedule of the performance of work on the theme. It is a program of the work as a whole and by stages (sections), which has been agreed to by the parties and constitutes an integral part of the concluded contract. The composition of the participants in the development of new equipment is also determined in accordance with it.

The organization which is the main developer is responsible for the fulfillment of the entire theme on the development of new equipment. The clear division of duties between him and the client is required precisely here. For the developer these duties are specified quite thoroughly in the Model Statute on the Procedure of the Conclusion of Economic Contracts and the Issuing of Intraministerial Orders for the Performance of Scientific Research, Experimental Design and Technological Operations,<sup>1</sup> while for the client they are confined only to the issuing of the order and the paying for the performed work. One of the basic problems of contractual relations is the working out at the concluding stage of the development of new equipment of calculations of the economic efficiency and prices. They should be submitted by the developer for approval to the client and its superior organ. Only after this can the superior organ of the developer examine and approve them. Thus, the developer is in a dependent, unequal position. At this stage of execution the client has many means of pressure on the developer, starting with the expression of dissatisfaction with the quality of execution of the prototype and suggestions on its further improvement (including in excess of the terms, which were specified by the issued order and the coordinated technical assignment) up to demands for the allocation on its behalf of a portion of the economic impact as the cop performer.

The possibilities of the developer to oppose the demands of the client at this stage of the development of new equipment are very limited: such a dispute requires an appeal to superior organs. Now, as a rule, in the products list plan of production of plants the manufacture of equipment is envisaged without consideration of the reserve of time, which would make it possible to postpone the submitting of the calculations of the economic efficiency for approval until the conclusion of the dispute on the validity of the demand of the client on the allocation on its behalf of the corresponding portion of it. At the same time the submitting for approval and the distribution of the economic efficiency on terms, which are dictated by the client, are a gross violation of economic interrelations.

As an example it is possible to cite the interrelations of the All-Union Scientific Research and Design Institute for Equipment for the Tire Industry (Yaroslavl) with the basic clients--the Scientific Research Institute of the Tire Industry (Moscow) and the Scientific Research Institute of Large Tires (Dnepropetrovsk). These institutes, regarding themselves as cop performers with respect to the equipment being developed, demand the drawing up of protocols on the allocation on their behalf of 50 percent of the obtained economic impact.

The institutes substantiate their demands by the expenditures, which are connected with the preparation of the order for the development of equipment, the submitting of the technical assignment for approval, the joint examination of technological documents at various stages of designing and participation in the tests and acceptance of prototypes. However, the listed operations in conformity with Paragraphs 5 and 8 of the Model Statute and Paragraph 1.4 of All-Union State Standard 15.001.73 are assigned to the client. This demand is at variance with the essence of contractual relations.

The use by the client of the materials, which have been drawn up as documents, on the portion of the economic impact with respect to the new equipment on its behalf leads to the distortion of the indicators of its amount and sphere of formation and to groundless deduction for the economic stimulation funds.

Contractual relations should not envisage conditions, when the client in accordance with its own contract with its performer could act as a cop performer. This would mean that the client, having turned over to the developer of new equipment the order and have assumed the duty to pay for its filling, at the same time should conclude with the main developer a contract for the performance of a portion of the operations, while the latter will be paid for to it as the cop performer.

However, if the client has the opportunity to perform some operations, it should do this on its own and at its own expense.

The existing situation, which is quite prevalent in the practice of the interrelations of the client and the developer, is frequently substantiated by the fact that the development and introduction of new equipment are a result of the work of enterprises and organizations, which are interconnected by the sequence of the output of a new product. This ostensibly also determines the need for the distribution of the obtained economic impact among the cop performers. The Method of Determining the Economic Efficiency of New Equipment, which was approved in 1977, proceeds from the localization of its amount as applied to each specifically taken developer.

It is necessary, in our opinion, to establish legislatively the equality of all the participants in the complex process of developing new equipment. The absence of this frequently leads to irregularities in the distribution of the economic impact, as well as the amounts of the deductions for economic stimulation funds.

Now the main developer of a theme can at its discretion determine the share of the economic impact for each participant-cop performer or let have it the organizations which accept for fulfillment a portion of the work (without considering the real contribution to the development). This is possible in case of an interest of the cop performers in obtaining additional amounts of work for the fulfillment of the plan. Conditions, which can to a certain degree be considered unequal, are possible here. The cop performers (having materials of similar developments on other themes) for the purpose of the fulfillment and exceeding of the plan and the obtaining accordingly also of larger amounts of deductions for the economic stimulation funds without necessary strain are themselves interested in such operations.



The main developer of a theme (especially when its fulfillment is carried out in execution of instructions and in accordance with comprehensive programs) is forced to enlist cop performers on the terms which for them are acceptable or desirable. The organizations which are the cop performers of the theme are far from always specified when settling the question of the necessity of developing new equipment. In many cases the search for them is the duty of the main developer of the theme. But, as a rule, it is difficult to do this, especially with respect to the most urgent directions for the development of highly efficient equipment (with the use of robotized systems and automation equipment, which are of the greatest importance for technical progress). The organization-cop performers in this case frequently receive the economic impact and deductions for economic stimulation funds in relatively greater amounts as compared with the actually performed operations.

The immediate cop performers of the theme are the organizations which fulfill individual stages and operations on the development of new equipment. They should receive a portion of the total economic impact in accordance with their participation in the work. However, objective criteria and indicators of the evaluation of this participation are lacking.

There are also difficulties with the recognition of the organizations, which perform special operations, as cop performers of the theme. Organizations, the operations of which apply exclusively to a specific theme and are of a specialized nature, can be them. But this is encountered far from always. In most cases the specialized organizations orient their developments for intersectorial use. The separately taken scientific research and experimental design theme is attached to the specific type of equipment being developed. Here the use of complexes of program logic control can be an example. They are not developed for each object of new equipment, but are made up from series-produced components and are attached to the units, lines, machine tools and machines, which are being developed.

The settlement of the question of which operations can be recognized as original developments will make it possible to specify the conditions of their grouping with those performed at the level of cop performance. This will make it possible also to establish the procedure of the objective distribution of the economic impact and the deductions for economic stimulation funds.

At the same time the regulation of the interrelations between the developers of new equipment and those organizations, which perform subcontracting operations on the attachment of previously developed assemblies and components to this equipment, will become possible. The operations being performed by them should be paid for at cost (including the profit) without the allocation to them of a portion of the economic impact.

It is no less important, in our opinion, also to change such a quite prevalent situation, when the organizations, to which the technical specifications are submitted for approval, do this for a fee, establishing it, moreover, at their own discretion. Several of these organizations require the issuing of certificates on the transfer of a portion of the economic impact with respect to the new equipment being developed. Here the agreement on the use in designs of bearings, reduction gears and chains can serve as an example.

This agreement is carried out not in the interests of the developer or the producer of the new equipment, who can use a large number of interchangeable components. It has as a goal the optimum formulation of the plan of the output of products in the corresponding sectors on the basis of the existing production possibilities. Thus, the requirement of agreement is aimed at the provision of the optimum conditions of the work of the sectors which produce components.

Why do the developers of new equipment agree to draw up documents on the economic impact, which the individual types of components used in the designs ostensibly account for, and to pay for so-called services? Only because it is significantly more difficult to overcome the demand of the organization, which certifies the agreement, than to draw up the certificate and to make payment. The organizations, which certify agreements, obtain the opportunity to increase very significantly the indicators of the efficiency of their work and to increase the sources of the formation of economic stimulation funds.

It is necessary to note that pricing organs have never established rates for the payment for "services." They are determined by the organizations themselves.

The above-examined problems of guaranteeing the interests of scientific research and planning and design organizations, which develop new equipment, should, in our opinion, find their solution in the new Statute on the Conclusion of Contracts for the Development of New Equipment. The guarantees of the rights of the organizations which are the developers of new equipment in the interrelations with clients, coperformers and other organizations are assuming greater and greater importance.

#### FOOTNOTE

1. Hereinafter the Model Statute.

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## ORGANIZATION, PLANNING AND COORDINATION

### ESTONIAN COUNCIL FOR COORDINATION OF SCIENCES

Tallinn SOVETSKAYA ESTONIYA in Russian 25 Dec 84 p 2

[Interview with Raymo Nikolayevich Pullat, deputy chairman of the Estonian Republic Council for the Coordination of the Technical and Social Sciences attached to the Presidium of the Estonian SSR Academy of Sciences, by SOVETSKAYA ESTONIYA correspondent A. Favorskaya: "The Impact of Coordination"; date not specified]

[Text] The coordinated, goal-oriented activity of the scientists of various institutions and departments is today one of the decisive conditions of the efficient use of the potential of science in the national economy and the quickest introduction of its achievements in practice. Life itself daily requires the improvement of the organization of research and the increase of the reliability of the contact of science and production. The regular session of the Council for Coordination of the USSR Academy of Sciences, which was recently held in Yerevan, examined the tasks of the academies of sciences of the union republics precisely from this standpoint. The joint solution by the republics of the important scientific and technical problems, on which the further economic and social progress of the country will depend, was planned at it.

How are these problems being solved within our republic. To what extent is the demand on scientists, which was stated at the June (1983) CPSU Central Committee Plenum by Comrade K. U. Chernenko: "...it is necessary to act with a greater orientation toward the future, to 'detect the imminent trends' in good time," being taken into account? Our correspondent spoke about this in the Republic Council for the Coordination of the Technical and Social Sciences attached to the Presidium of the Estonian SSR Academy of Sciences with R. Pullat, deputy chairman of the council.

[Question] Raymo Nikolayevich, the qualitative improvement of the work on coordination is a requirement of the times. On what main problems is the



council focusing its attention, what is most important for you in the work? And what is most difficult?

[Answer] The most important thing, without a doubt, is to achieve agreement in the scientific and technical directions which are the priority ones today for science of the country and for the republic. This is, first of all, of course, the work on the efficient use of natural resources, on food, biotechnological and energy-saving problems and on the development of effective biologicals and means of protecting agricultural plants.

[Question] But in all these directions comprehensive scientific and technical programs have already been adopted and are in effect, while, as is known, the goals, the dates and the performers of the work are clearly specified in them. Incidentally, how many such programs are now in effect in the republic?

[Answer] Along the lines of the Academy of Sciences alone there are 10, 1,400 workers are taking part in them. While in all there are 24 republic programs. Plus another 18 all-union scientific and technical programs, to the fulfillment of which our institutes are also making their contribution. Often the different directions of the work are closely linked in something--and then for the success of the matter it is necessary to reduce the various performers "to a common denominator," so that such programs would interact. But the council can only **ADVISE** [in boldface], but is not empowered to **ORDER** [in boldface]. It is here that difficulties arise at times.

[Question] You want to say that the management of research of necessity should become more and more flexible--in order to respond quickly to the new problems which life poses. What cases from the practical experience of the council confirm this necessity?

[Answer] For example, several years ago the republic had to determine the basic directions of the development of its power engineering--to specify, what its fuel and energy complex should be in light of the decisions of the 26th party congress. At that time we got together a coordinating conference on these questions directly at the Estonskaya GRES and invited both scientists and experienced workers. The question was discussed and weighed thoroughly. While a year later we returned to the energy problems, already at the level of the All-Union Council for Coordination. Its session was held in Tallinn, both Academician A. P. Aleksandrov himself, the president of the Academy of Sciences of the country, and many other well-known academicians--V. Kotel'nikov, P. Fedoseyev, B. Paton and V. Ambartsumyan--took part in it. As a result a large number of very difficult problems, which concern the role of our republic in the energy balance of the country, were solved not only competently, but also efficiently.

[Question] Incidentally, the all-union theoretical science journal GORYUCHIYE SLANTSY has now begun to be published in our republic. Is this also an example from the area of coordination in scientific work?

[Answer] You see, there is no longer anywhere such experience and such specialists in the complete use of shales as in Estonia, although this promising raw material is also available in other places. The decision of the

Presidium of the USSR Academy of Sciences to entrust the publication of this journal, in which this problem would be covered, precisely to our scientists is therefore also natural. Vice President of the Estonian SSR Academy of Sciences I. Epik, the winner of the USSR State Prize for work in the area of shale power engineering, heads its editorial board. Valuable experience should not lie a long time in any sector, is that not so? Especially now, when it is required of scientists to formulate the principles of the increase of the efficiency of the entire national economy and the changeover of our entire economy to the intensive means.

[Question] But one often still has occasion to hear that research lacks precisely a concrete technical basis, lacks economic and social calculations. Has you council had occasion to come across such a problem?

[Answer] Even quite recently, it must be said. When the questions connected with the study and efficient use of our coastal waters and inland bodies of water were being discussed. It turned out that there are many discrepancies here, that scientific institutions and fishing departments need a unified program of actions. But for the present such a comprehensive program has not been completely formulated, the paths of researchers and economic managers often run like two parallel straight lines which do not intersect anywhere. K. Rebane, the president of our Academy of Sciences--he was in charge of this well-attended meeting of scientists and experienced workers--took an interest in what is being done in our republic against the pollution of bodies of water, and received a very vague answer. It is characteristic that much research, particularly on Chudskoye Lake, is being conducted slowly, this is delaying the taking of specific steps. Research is not intended, so to speak, for direct interference in the state of affairs. The conference also had to state another thing, that the working contacts with our neighbors--Leningrad and Pskov specialists in the area of the study of waters and their protection against pollution--for the present are also inadequate. The council in its decision placed special stress on this.

[Question] To keep pace with life, as you are more and more often convinced, is no long sufficient for science. It should lead practice: only then, probably, will the impact from the uniting of scientific forces and assets, from coordination also be full.

[Answer] I agree. In order to be in front, science needs a constant analysis, in what main directions our society and our republic are heading toward their social and economic progress. What is one to consider the priority directions for the immediate future in Estonia, what tasks follow from this for scientists? First, our specialists need to formulate and substantiate plans of the complete efficient use of local natural resources. Moreover, to substantiate them thoroughly--technologically, economically and ecologically.

At the same time it is necessary to determine and completely substantiate the directions of the technological revolution with respect to all the most important national economic sectors, including in the new production spheres.

The analysis and forecast of the structure of the entire national economy of the republic and the scientific substantiation of the changes which should occur here also belong among the priority directions.

[Question] To all appearances, a large number of new steps will be taken for the development of research and its coordination in these important areas. Apparently, the new forms of cooperation between science and practice will also attract more extensive attention--they are already making their way into the world. In this connection there is the following question: in our conversation we have not yet for some reason mentioned once in connection with the intensification of the economy that without which it is simply inconceivable--computer technology, microprocessors, the means which are connected with the development of robotics and versatile production systems, and so forth. But all this is already being developed and little by little is also winning itself a place in production in our republic. Is the work in this most important direction being coordinated?

[Answer] The question is legitimate. The coordination of the problems of computer technology to a large extent is being carried out within the republic comprehensive scientific and technical program "Microprocessor Systems of Automation and Computer Equipment" (the scientific supervisor is Academician of the Estonian SSR Academy of Sciences B. Tamm).

As to robotics and versatile production systems, their problems are regulated by the corresponding orders of the republic government, the scientific and technical council attached to the Tallinn City Committee of the Estonian CP, of which representatives of the corresponding specialties from among the scientists of Tallinn Polytechnical Institute and production workers are members, is dealing with the questions of coordination. Taking into account the great importance of the questions of computer technology and automation, the General Assembly of the Academy of Sciences made the suggestion to separate from the Physical, Technical and Mathematical Sciences Department a new department--of information science and technical physics.

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## ORGANIZATION, PLANNING AND COORDINATION

### STRUCTURAL DEVELOPMENT OF SCIENTIFIC PRODUCTION ASSOCIATIONS

Moscow KHOZYAYSTVO I PRAVO in Russian No 1, Jan 85 pp 54-57

[Article by Candidate of Juridical Sciences A. Shokhin: "Problems of the Development of Scientific Production Associations"]

[Text] The experience of the work of these most important units of the organization of scientific and technical progress in the sector confirms the effectiveness of the integration of science and production in the matter of accelerating the introduction of scientific and technical achievements. The further improvement of the relations within scientific production associations should be coordinated with the requirements of Decree No 814 of the CPSU Central Committee and the USSR Council of Ministers of 18 August 1983, "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy."

In the Statute on the Scientific Production Association<sup>2</sup> it is envisaged that scientific research, design, planning and design and technological organizations, plants (factories), start-up and adjustment, contract supervision and other structural units, which are not legal persons, are a part of it. This reflects the objectively existing law of the closer and closer connection of science and production within a single complex. However, at present more than half of the listed organizations are carried on an independent balance sheet and have the rights of a legal person.<sup>3</sup>

At a number of associations the volume of series production exceeds the amounts of scientific research and experimental design operations; often the gap between them is continuing to increase. For example, whereas initially the ratio between of these amounts at the Steklomash All-Union Scientific Production Association (Moscow) was 1 to 6, subsequently it was 1 to 25. Such a process can lead to the transformation of a scientific production association into a production association. Frequently the real role of the scientific subdivision is negligible, and the production of series-produced output holds the leading place.<sup>4</sup>

Thus, the task of elaborating measures on the elimination of the conflict between legislation and practice is arising.



The formation of such an internal structure, which would make it possible to shorten as much as possible the duration of the science-production cycle, to eliminate the lack of conformity of the amounts of scientific research and experimental design operations to the volumes of series production and to speed up the process of the conversion of legally independent subdivisions to the legal status of structural units, is necessary. This should be accomplished on the basis of a set of measures of an economic, organizational, planning and financial order, which are realized in the appropriate legal forms.

At scientific production associations the practice of the separate planning of science and production up to now has not been overcome: the superior organ establishes the plan indicators separately for scientific research and experimental design operations and series production. In other words, there is no unified financial base. Moreover, pilot and series production, in spite of their fundamental difference, are planned according to the same indicators. At times in violation of the established regulations the superior organ continues to report the plan assignments to the structural subdivisions, bypassing the management of the association. This prevents the strengthening of the unity of its subdivisions. However, in our opinion, the setting down in legislation of norms, which prohibit the reporting to scientific production associations of the indicators, which plan separately the activity in the sphere of scientific research and design operations and on series production, would hardly be effective. Apparently, in addition to this, the corresponding economic, organizational and financial levers are needed.

The practice of formulating comprehensive scientific and technical programs (KNTP's), in our opinion, is very promising. They encompass the activity of all the subdivisions of the scientific production association: from scientific development and the performance of design operations to the introduction of an idea in production. The drafting of a plan of scientific research and experimental design operations (NIOKR) is stipulated by legislation. However, it is inadequately linked with the production activity of the association. The experience of the work of the Impul's Scientific Production Association imeni XXV s"yezda KPSS (Severodonetsk), the All-Union Scientific Research Institute of Construction and Road Machine Building (Moscow) and others shows that the comprehensive scientific and technical program, which also has within it a plan of scientific research and experimental design operations, ensures the comprehensive development of the association. However, it should not formulate a comprehensive scientific and technical program, since the prevailing enforceable enactments do not envisage this. The superior organ also does not approve plan indicators (standards), which if only in generalized form did not apply to the activity of the entire complex. The proposals to supplement the Statute with a norm, which envisages the formulation of comprehensive scientific and technical programs, seem quite valid. At the same time it is advisable also to include among the indicators, which are approved for the scientific production association by the superior organ, such indicators which reflect the work of the entire complex on the fulfillment of the main task--the development and introduction in production of the advanced achievements of science and technology. The indicator of the annual economic impact from the introduction of scientific research and

experimental design operations, in the opinion of many economists, is most preferable.

At the same time as this measures on the centralization of management and the performance of a number of production economic functions should be implemented. The experience of the work of the Mikroprovod Scientific Production Association (Kishinev), the Impul's Scientific Production Association (Severodonetsk) and a number of others attests to the gradual uniting of the divisions and services of the structural units. At the first stage, as a rule, the economic planning, accounting and financial services, the divisions of labor and wages, personnel, supply and capital construction and several others are centralized. At the second stage the scientific and technical and the production divisions are centralized. The centralization of production economic functions is far from always advisable at the main structural unit (the scientific research institute or design bureau). The pilot shop can be located at a plant where series production is concentrated, while the design subdivision can be turned over to the disposal of the scientific research institute. The design and pilot subdivisions can also be located at the plant. The main thing in the process of the centralization of management and the implementation of production economic functions is to concentrate them in one structural unit and to remove them from the others. In a number of cases it is not of fundamental importance, in which structural unit they are centralized.

A fundamental peculiarity of the scientific production association is the assignment of the duty of managing the scientific production complex to the management staff of the scientific subdivision (scientific research institute, design bureau). Therefore the function of the management of the complex should be performed only by the scientific structural unit.

Practical experience shows that in case of an increase of the amount of work in the area of scientific and technical progress the corresponding staff of the association increases. For example, the making of an analysis and the approval of the technical assignments on scientific research and experimental design operations (which are performed by enterprises and production associations of the sector or subsector) and the creation of a scientific and technical information service presume the specialization of a number of personnel (or even divisions of the main structural unit) for their fulfillment. In the management staff the process of the differentiation of the management of only its own complex and individual questions outside it begins. In the future it is possible also to allow the setting up of an association with an organizationally separate management staff. Such experience already exists within production associations in industry. The assignment of the function of the management of the scientific production complex to the scientific research subdivisions inevitably has the result that the expenses on its maintenance are attributed to the results of its activity. This entails the groundless increase of the expenses which go for the item of scientific research work. With the increase of the activity in the interests of the sector or subsector such additional expenses frequently come to large amounts (at the expense of the assets of the main structural unit), for example, at the Sibtsvetmetavtomatika Scientific Production Association (Krasnoyarsk). It seems that there should be included in the Statute a norm,

which allows in individual cases for the management of the scientific production association a management staff, which is organizationally separate from the structural units, also to be set up.

The too rigid, in our opinion, approach to the differentiation of scientific and design services, pilot and series-producing works should be revised. Specialization, of course, is necessary, but it is also necessary to develop other forms of the interconnection of science and production within scientific production associations. Multiple-skill creative brigades (divisions), which deal with the development and introduction of scientific achievements in production, are well known to practice. They include researchers, designers, process engineers and workers and perform the entire cycle in accordance with a unified plan--from research to its introduction in production.

The activity on the basis of cost accounting brought into being a new organizational form of the performance of research and design operations and their introduction in series production within the association--scientific production (intrafirm) complexes. The experience of a number of scientific production associations of Leningrad showed the great efficiency of their work. Like the multiple-skill brigade, they include researchers, designers, process engineers and production workers and perform the operations on the theme from research to the introduction of the results in series production. A scientific and design sectors or divisions, groups of process engineers and pilot and production shops or sections are distinguished within the complex. The manager of the scientific production complex is appointed by the general director. Usually the scientific production complex exists not only until the introduction of an idea in production, but also for the period of series production. In case of the halt of series production the complex is reorganized. Scientific and design groups, which carry out the development of ideas and their testing, are formed here.

In contrast to multiple-skill creative brigades the scientific production (intrafirm) complexes have greater property and organizational independence: they have a separate balance sheet and operate for a longer time. The scientific production complexes in legal status have much in common with structural units, the only difference is: they do not conclude contracts. But in their specialization the scientific production complexes differ significantly from the traditional structural units by the fact that they remind one in miniature of the association itself. They conduct research on a separate problem (product), perform pilot design and experimental operations and introduce new equipment in series production. The scientific production (intrafirm) complexes are a new legal organizational form of the uniting of science and production within the scientific production association. In the Statute there are no norms which specify their legal status. It is entirely permissible, in our opinion, to extend to them the effect of the norms which are designed for structural units. In any case the approval by the general director of a special statute on the scientific production (intrafirm) complex is necessary. It is more correct, in our opinion, to call them scientific production structural units.

Experience will give an answer to the question: Should they become predominant within scientific production associations? At present only one



thing is clear: such structural units are necessary when it is required to speed up drastically the process of the development of a specific idea to its introduction in production and subsequent improvement during series production. Not by chance did the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" deem it expedient to broaden the practice of the organization at associations of temporary scientific production subdivisions for the most important national economic problems.

Within the scientific production association science and production are being combined even more closely in the activity of the scientific production structural units. This is making it possible to speed up the process of the conversion of independent (with the rights of a legal person) subdivisions to the legal status of structural units. The practical experience of their work should be reflected in the Statute (in the corresponding addenda).

Many problems are arising in the process of organizing internal cost accounting. If enterprises and organizations retain the status of a legal person, cost accounting relations emerge between them and the association with the reflection of the results in the current accounts. The organization of cost accounting relations on the basis of the deprivation of structural units of the rights of a legal person, in our opinion, is more preferable.

But in this case as well the internal cost accounting of the scientific production association is based on specific principles: the property separation of the structural units, the organization of their activity on the basis of the plan assignments, day-to-day management independence (within the plan); economic stimulation (incentive and liability) for the results of the work.

Each of the listed principles is realized in a different way in the activity of the structural units. The scientific structural unit experiences difficulties in the formation of working capital. Therefore it is forced to attribute some expenses to the account of the production subdivisions of the associations. For example, the expenses on the preparation of planning estimates are usually attributed to the plant account "expenses of future periods." Stocks of "illiquid" equipment, which it is impossible to write off, are frequent at the pilot works, but at times due to its great individuality it is also impossible to sell it. The differences in the set of plan indicators, which are reported to the scientific, pilot and series-producing works, prevent the organization of the material incentive and liability.

The drafting of special statutes on internal cost accounting helps to overcome these difficulties. They reflect the specific nature of the activity of the structural units and set down the above-listed principles of internal cost accounting. In our opinion, the preparation of a Model Statute on the Internal Cost Accounting of the Scientific Production Association, which the USSR State Planning Committee could adopt in consultation with the USSR State Committee for Science and Technology, is advisable. The procedure of the formation and distribution of the unified material incentive fund of the



association, which is now created by means of numerous sources, should be specified precisely here.

The general bases (principles) of the responsibility of the structural units for the nonfulfillment of the plan assignments and obligations should also be stipulated. The sanctions and claims of the structural units against each other stem from the specific nature of the activity of each of them, therefore it would be more correct to specify in detail their amounts and procedure of raising in an individual Statute on Internal Cost Accounting.

It should be admitted that the opening of current accounts is not the best means of organizing internal cost accounting. This also applies to the keeping at the scientific production association of united settlement accounts. The current accounts of the structural units, on the one hand, facilitate the organization of cost accounting within the association, but increase even more the gap between the scientific and production subdivisions. On the other hand, the introduction of a united settlement account makes it possible to shift monetary assets, but clearly does not ensure their strictly special-purpose use for scientific and current production activity.

The literature contains statements to the effect that the work on the improvement of the cost accounting system of the scientific production association should begin not with the uniting of accounts. It is necessary to regard it as a logical continuation of the measures on the improvement of planning and reporting. And, in our opinion, the Statute on the Internal Cost Accounting of the Scientific Production Association should act as the legal basis of this.

The contractual relations on the development and introduction of new equipment were traditionally regulated by a number of contracts: for the performance of scientific research, experimental design and technological operations, for the performance of planning and surveying operations, for the transfer of scientific and technical achievements and the know-how of their use and so on. They are also being concluded now. However, the tasks, which face the association as a unified scientific production complex, go beyond these legal forms. Single contracts for the entire set of operations--from the fulfillment of scientific developments to their introduction in production--are being concluded more and more often. Their names are different, moreover, they are frequently called general agreements (for example, the contract of the Pishchepromavtomatika Scientific Production Association with the Verkhnedneprovsk Starch and Molasses Combine for the performance of a set of operations on the automation of technological processes). Of course, the main thing is not the name of the contract, but whether the rights and duties of the parties are properly specified in it and whether it conforms to the needs of practice.

In our opinion, the experience of those associations, which, in concluding such contracts, regulate their fulfillment by individual stages: from scientific development to start-up and adjustment work, should be endorsed. The conclusion of contracts for the performance of scientific research, experimental design, technological, planning and surveying and start-up and

adjustment operations is permissible on the basis of the general agreement. The arising relations, thus, are regulated by the enforceable enactments which are intended for the listed types of contracts.

At the same time another thing is also clear: the formed system of economic relations with respect to the development and introduction of new equipment also requires a new legal form. It seems that it is necessary to draft a Statute on the Procedure of the Conclusion and Fulfillment of Comprehensive Contracts and Intraministerial Orders for the Development and Introduction of New Equipment. When preparing it, it is necessary to take into account not only the content of the enforceable enactments, which now regulate individual types of contractual relations in the area of scientific and technical cooperation, but also the stabilizing practice of the work of associations. In the named enforceable enactment it should be indicated that along with the comprehensive (general) agreement for the development and introduction in production of new equipment the parties, if the operations go beyond 1 year, can also conclude additional agreements which would specify the obligations of the parties during the new year.

#### FOOTNOTES

1. SOBRANIYE POSTANOVLENIY PRAVITEL'STVA SSSR, No 24, 1983.
2. Hereinafter the Statute.
3. By 1980 the number of independent organizations, which were included in scientific production associations, was even greater and came to about three-fourths of their total number. See "Mekhanizm khozyaystvovaniya v nauchno-proizvodstvennykh ob'yedineniyakh" [The Mechanism of Management at Scientific Production Associations], Leningrad, Izdatel'stvo LGU, 1982, p 34.
4. Such, for example, is the Dagestan Scientific Production Agroindustrial Association for Viticulture and Viniculture. See N. A. Aliyev, Sh. F. Irakov, "Nauchno-proizvodstvennyye ob'yedineniya vinodel'cheskoy promyshlennosti" [Scientific Production Associations of the Winemaking Industry], Moscow, "Legkaya i pishchevaya promyshlennost'", 1982, pp 3, 4ff.

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## ORGANIZATION, PLANNING AND COORDINATION

## INEFFECTIVE REORGANIZATION AT NEMCHINOVKA AGRICULTURAL INSTITUTE

Moscow SOVETSKAYA ROSSIYA in Russian 9 Jan 85 p 2

[Article by SOVETSKAYA ROSSIYA special correspondent E. Fedorova (Moscow Oblast): "No Further Than One's Own Plot"]

[Text] More than a year ago the work of the scientific research institute in Nemchinovka was severely criticized. A commission of the Party Control Committee attached to the CPSU Central Committee revealed serious shortcomings in the management of the collective and in introduction activity. The executives of the Scientific Research Institute of Agriculture for Central Regions of the Nonchernozem Zone received penalties. In the article "Imaginary Millions" SOVETSKAYA ROSSIYA wrote about the low output of the subdivisions of the institute and the overstated self-evaluations.

Replying to the editorial office, Institute Director G. V. Gulyayev and Party Committee Secretary V. A. Pukhal'skiy reported on the steps which are being taken for the elimination of the revealed shortcomings and the increase of the efficiency of scientific research and development. These steps, as was indicated in the reply, had ensured positive changes and are making it possible to hope for an upswing in the creative work of the collective. At the editorial office they made a note of the reply. It was decided, as has been established in practice, to examine after a while what fruits the reorganization would bear. The visit to the editorial office of several scientists hastened the return to the theme. They reported that the elaborated measures are formal and ineffective, during the reorganization the staff members, who revealed shortcomings, are being limited in every way.

One of the most significant shortcomings, for which they criticized the institute, is the small proportion of Nemchinovka strains in the Nonchernozem field. The assets for their breeding have been spent, but there has been no gain for the state. In order to set the matter straight and set up the reproduction of selected seeds, at the institute they reorganized the Department of Seed Growing. They added to it the personnel from other eliminated subdivisions and assigned the management to Doctor of Agricultural Sciences Professor G. F. Nikitenko. Of course, it is still too early to speak about specific results. At present another thing is important: how accurately the reorganized department sees its tasks and with what frame of mind the people are setting to work on their accomplishment.

Seed growers had to be sought at the old addresses, in the former, as yet not renamed Department of Methods, in the laboratory of perennial grasses. It is clear that the point lies not in the tables--does it rarely happen that they will change the sign, but the filling remains? Before long, however, I am convinced that in Nemchinovka neither has changed: both the familiar names and the former directions in work. The veterans of the department vouched: the reinforcement and strengthening occurred on paper, while the personnel who were brought in are continuing to deal with their previously begun themes. How can that be, for the department has a new program? There should be one, but it is not there for verification. Department Chief Professor Nikitenko repeatedly submitted a draft to the scientific and technical council, but it returned it just as many times for alteration. In itself a sharp dispute is a good sign, it can attest to adherence to principles and a collective interest in affairs. It was not that in Nemchinovka, here the dragged out dispute did not strike a creative spark.

Not only the program discrepancies are surprising and put one on the alert. They united into a new collective staff members who, as it turned out, are little disposed to working in the direction which the adopted structure prescribes. G. F. Nikitenko, when transferring to seed growing, reserved the right "to appeal to superior instances against the issue of the elimination of his department." Candidate of Sciences Yu. S. Shcheglov indicated in the statement: his consent to the transfer was forced, here he "categorically objects to the elimination of his laboratory."

They carried out the change of the structure . . . the institute not on the spur of the moment. However, the situation in the Department of Seed Growing shows that the reorganization at the scientific research institute did not become an effective factor. On the contrary, up to now a train of dissatisfactions, resentments and complaints stretch behind it.

I am rereading the prospectus, which was published on the occasion of the 50th anniversary of the institute. The anniversary publication, of course, covers life in a cheerful tone. But, in addition to the advertising key, in the prospectus there are many factual exaggerations and presumptuous annotations. In recent years self-contentment has become for the Nemchinovka workers festive--constant self-sensation. And today you talk in one or another laboratory and sense: the self-appraisals of many have remained the previous ones--"it was always believed that we work well." Comprehensive careful checks established: by no means well. The entire collective was in debt to the state. The idea is distressing, but every staff member should be imbued with it, everyone should review the measure and quality of his contribution to the general institute money box. The party committee and the local trade union committee should also have directed the attention of the collective to such a strict inspection.

We are discussing with G. F. Nikitenko the fate of his former department--the methods of scientific research and the management of experimental stations. He recalls the services of the department, but bypasses the shortcomings. It is well known that the management of oblast experimental stations was inefficient. Consequently, there were grounds to transfer this section of work to another department. Why does the professor pass this action off as



arbitrariness of the board of directors? The appointment of Nikitenko to the Department of Seed Growing was connected with the recognition of his great competence in this matter. For many years Georgiy Filippovich wrote scientific works on seed growing. Incidentally, the chief of the institute and M. V. Boldyrev, chief of the Economics Department, worked on this problem. They published methods and recommendations. Who, if not the institute first of all, is to use them and to show an example of the modern organization of seed growing? When it came to business, the scientists began disputes and squabbles about who is to set to work on it.

As was already said, Yu. S. Shcheglov prior to the revision of the structure headed the laboratory of perennial grasses. Many times they prompted the collective and indicated that its creation--fodder rye--is not getting into the broad field. It is necessary to reject above-plan themes, with respect to which, incidentally, the laboratory is duplicating the All-Union Institute of Fodders, and to engage in the introduction of its own strains in production. Colleagues know in Shcheglov his strong creative, questing streak. On his own experimental plot he is an indefatigable worker. And they notice: Yuriy Sergeyevich dislikes very much to visit farms, he does not have strong contacts with experienced workers, he does not accept the means which has been tested by the leading breeders.

Of course, Shcheglov agrees with the requirement: the strain should work. But this agreement, unfortunately, is only on the theoretical level. He also does not object to the strengthening of the Department of Seed Growing, there, he says, energetic, skilled forces are needed. But where these forces will come from, does not concern the communist Shcheglov. He himself with the transfer to the department did not make the prescribed turn in the direction of seed growing.

Institute Director G. V. Gulyayev began the conversation with me with a description of the associates, in whom he presumes the initiators of the appeal to the editorial office. Sharp, categorical appraisals followed. "Several scientists conceived the idea to remove the director, hence the incessant letters and anonymous letters," Gulyayev explained the situation. "On the scientific level these are useless people, they are active only in words, are entirely played out creatively, are far from production." Meanwhile quite recently Gulyayev appeared as coauthor with one of the named scientists. At present they also head important sections at the institute. How, given such qualities, do they entrust them with these posts? How, given such mutual hostility, do the manager and the scientists associate with each other and cooperate? Taking into consideration the difficulties of the reorganization period and the irritation of the administrator, which is being increased by the complaints, I should all the same say that the level of criticism meant for the colleagues in this office was not the director's level, both with respect to content and with respect to form. Personal hostility and facts from not the scientific, everyday sphere overshadowed the essence of the matter and prevented an objective analysis of the positive changes and weak points of the reorganization.

At the Tolstopal'tsevo Pilot Production Farm Yu. S. Shcheglov in my presence reproached the chief agronomist there: they had not carried out the necessary

agrotechnical technique, due to which they lost much on every hectare. They had gathered only a quintal of clover seeds per hectare, while Shcheglov in Nemchinovka had obtained 4 quintals per hectare. I had not had time to return to the institute, when I received a note from the director: "The harvest of clover seeds of Shcheglov is not 4 quintals, as was stated, but only 0.8 quintal." The information was verified by the chief accountant. Further there is the commentary of Gulyayev: "You see, Shcheglov deceived you, but you believe him and the others." Well what do you say here about the relations of the manager and the subordinates?

G. V. Gulyayev belongs to the highest, so to speak, echelon of science. He is a corresponding member of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin. Who, if not he, is to be at the institute a model of selfless service to the cause, the bearer of the lofty spirit of cooperation and the unity of scientists, the guard of the good traditions, which were established at Nemchinovka earlier? The arguments about high categories are shattered, however, against stern prose: by order of the management they sealed Shcheglov's barn with seeds. That is, the story with the clover is not over. At the moment dubious rumors have begun to spread through the institute.

A check revealed errors in accounting. On the part of the scientist, as I had hoped, there was no deception. Nevertheless you will not eliminate another unappealing detail from the institute's portrait.

It is a minor fact which, it would seem, is not worthy of attention. I cited it specially so that scientists would look from the side at the manner of actions, the style of their own relations. They saw on what time and emotions are spent at times and how fruitless and wasteful these expenditures are.

Mutual disrespect and the finding in each other of mistakes and blunders not for the purpose of correcting, but in order to hurt--relations of this sort not only decrease the creative tone in scientific subdivisions. From there they infiltrate the production collectives, decrease the authority of scientists and undermine the confidence in their developments. Not by chance did the same agronomist at Tolstopal'tsevo ignore the promptings of the scientists and not use the recommended preparations. Or there is another incident. At the institute's design bureau they made a beet harvester. In the words of the authors, it removes the top separately and cleanly and makes it possible to use it completely, without losses. But I know quite conclusively that at Nemchinovka they harvested the beets by hand. What is the matter? It is the fact that the managers of the experimental model farms also do not let the inventors with their new machine close to the beet field.

In the large institute collective, of course, there are subdivisions which are working along an ascending line. These are the laboratories of Corresponding Member of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin E. D. Nettevich, Candidate of Agricultural Sciences A. A. Goncharenko and Professor K. I. Saranin. Recently the institute's scientists drafted a detailed plan of participation in the affairs of the Moscow area. But let us put off the good, approving speeches until later. At present it is more important to identify the weak spots in the activity of the collective and to

focus attention on the sections, in which for the present the reorganization is not working, and on the reasons why it is not working.

During the reorganization the workers of the RSFSR Ministry of Agriculture, the academy, the Moscow Oblast Party Committee and the Odintsovo City Party Committee repeatedly corrected the scientists of the Scientific Research Institute of Agriculture. This was done both while working and at open party meetings. It was noted that the scientists had not discussed constructively enough the new structure and were changing their methods slowly and passively. At the same time the fruitless disputes and accusations at each other did not cease. All this is also now continuing to weaken the forces of the collective and is preventing proper concentration on the important and specific problems, the solution of which production expects from the institute.

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## ORGANIZATION, PLANNING AND COORDINATION

### PROBLEMS, MEANS OF INTRODUCING NEW IDEAS IN INDUSTRY

Moscow SOVETSKAYA ROSSIYA in Russian 18 Jan 85 p 3

[Interview with Hero of Socialist Labor Academician Vladimir Stepanovich Shpak by SOVETSKAYA ROSSIYA special correspondents M. Belousov and V. Lysenko (Leningrad): "The Truncated Calculation"; date not specified]

[Text] [Question] Vladimir Stepanovich, any promising idea of a scientist, it would seem, has the right to introduction. But in reality it is not always possible to exercise this right. And a disproportion is arising between the scientific reserve and its use. Where, in your opinion, are the roots of such a discrepancy?

[Answer] The problem is many-sided, not without reason are they writing and arguing a lot about it. It worries everyone. A search is under way for forms which would make it possible to unite practice and theory. In the Ukraine, the Baltic republics and the Caucasus scientific and technical centers for the coordination of work on chemistry, for example, have been set up. I head the Leningrad Center, which studies and establishes the scientific potential of 8 head ministries, 2 academic institutes and nearly 15 higher educational institutions, in order to place their developments in the serve of 2 ministries: of the chemical industry and mineral fertilizer production. In Leningrad, for example, a scientific firm with a large staff of skilled personnel, which is excellently furnished with equipment--the Institute of High Molecular Compounds of the USSR Academy of Sciences--is in operation. Frankly speaking, it itself never brings any development of its own up to industrial implementation, because the institute does not have process engineers, a planning bureau and designers. Thus, there is also no possibility to check its ideas. But the firm is rich in ideas. And this is well known to us, at the center for coordination.

The scientists of the institute ascertained the theoretical possibility to change the strength of polymers. The molecule of a polymer has a complex, I would say, intricate configuration. But if one "untangles" it, having stretched the molecule, strains it, having given it a specific linear form, and then fixes it in such a position, it will "work" like the reinforcement in reinforced concrete. And the material will immediately become stronger. The institute has received the initial data, which will make it possible to approach a technical solution.



Everything would have ended at this, if the center had not brought together the institute and the Plastpolimer Association, which has planners and its own plants. An order-decree of the Academy of Sciences and the Ministry of the Chemical Industry consolidated this union, in which the Machine Building Association imeni K. Marx, which undertook to make the equipment, was also included. And a comprehensive program on the development of a technical method of obtaining strengthened polymeric materials arose. After the start-up of the unit they calculated the annual impact from the start-up of the shop: 30 million rubles. Now the ministry has made a decision, and 100 standard automated units are already being made. While the scientists are continuing the experiments with other polymers.

I could also cite other examples, when the center was able to speed up introduction, but, unfortunately, there are tens of instances when nothing turned out for us.

[Question] Does it not follow from this that successful introduction is for the present a coincidence, while unsuccessful introduction is a rule, a regularity? And if that is how it is, does this not mean that industry is not interested in new ideas?

[Answer] The trouble is that the introduction of new equipment or technology in industry is poorly stimulated. Especially when it is a question not of millions of tons of output being produced, but, for example, of several thousand tons.

But, I repeat: there are too few stimuli. Departments cite the lack of assets (this has become even fashionable), although I am well aware that ministries often return hundreds of millions of rubles to the budget, not having been able to spend them. In my opinion, there is a fear of what is new, because introduction involves trouble and is of little advantage in the sense that they have become accustomed to understand this advantage in industry.

[Question] But in reality it turns out that someone, for example, the Ministry of the Chemical Industry, should produce a product, from which it will get nothing more except troubles, while the machine builders, who need this product, will save millions, will earn a bonus, will improve the indicators.

[Answer] An error also lies in the indicators. Indeed, the so-called shop impact, that is, the one obtained locally, will be small, invisible. But the fact that they will obtain millions in the sector, in machine building, this does not interest anyone except the machine builders themselves. Incidentally, the users of innovations, as a rule, confirm with much difficulty their own advantages from the introduction of ideas "from elsewhere." They are afraid that assets may migrate from their incentive funds to the funds of another department.

Today there is no developed form of stimulation, especially for small-tonnage works. The shop impact (in essence the intermediate impact) long ago had already come into conflict with the national economic impact--the ultimate

impact. The former can be even negative, unprofitable, while the national economic impact will amount to a profit of hundreds of millions of rubles. But this is the main thing. And when deriving the stimuli it is necessary, consequently, to bear in mind the national economic impacts, and not the narrow departmental impacts, which hinder cooperation, collaboration and progress in general. Now the scientists have prepared suggestions on the retooling of 27 plants of 4 ministries of the chemical type. They proceeded, of course, from the available scientific reserve and directed attention to the front line of chemistry. As yet less than half of our suggestions have been adopted. There is no interest in the others for the already named reasons. Hence, an immense scientific reserve will simply remain on the academy's shelves.

[Question] What, in your opinion, is one to do so that they would not only listen to the opinion of scientists, but also take it into account? In short, how is it possible to change the practice of introducing scientific developments, while avoiding "departmental fights" and division into profitable and unprofitable introduction, shop and national economic introduction?

[Answer] Our leading scientists are not taking today a proper part in the final formulation of industrial programs. Every department does this on its own and with its own wits, openly being rather afraid of the opinion of scientists. But it is necessary, in my opinion, that an expert council of scientists would examine the results of all scientific work of the technical type. And that the council would have not only its own say or voice at the moment of the making of a decision, but the decisive say and decisive voice.

Further, so it seems to me, it is necessary to change the practice of distributing assets among the main administrations of ministries, what are called "limits." Today this occurs formally, for example, they allocate to a main administration 5 percent more than last year, regardless of the fact that for one main administration a major new problem has come to a head, while another one does not have such a problem. It is necessary to give scientists the right to examine the proposals on introduction, which do not fit into the "limits" of the main administrations, in order to make all the necessary redistributions.

Ministries consider it a great achievement that they have kept with the "limits." But the fact that 100 promising developments of scientists were not accepted for introduction and remained in the background, does not worry anyone. As a result "tight" spots are arising in the national economy. In particular, exactly the chemical industry has become today such a "tight" spot. Its contribution to the national economy is one-third to one-half the needs of industry. In my opinion, in the questions of what it is necessary to do and what it is necessary to put off, scientists often take a more state-oriented position than economic managers. So believe them!

[Question] It is a matter, obviously, not of trusting blindly in scientists, even though they are very competent, but, probably, of other means of argumentation, of making final decisions on another basis--not a departmental

basis, not a shop basis, but in the interests of the entire national economy of the country without exception.

[Answer] It is a question of formidable objective reasons, when it is being decided what to introduce and how to use the scientific reserve. And here there is one, at first glance, special problem. The introduction of new equipment is being poorly prepared by economists. In what sense? In order to discuss some suggestion or other of scientists, it is necessary to have technical and economic substantiations. As strange as it may be, planning organizations, which are quite capable of "reckoning up an idea" in detail, are prohibited to do this until the "idea" has been included in the title, that is, the financed list for capital construction. Previously the technical and economic report was discussed, and only then was a decision made. They have lost this know-how. Now they are attempting to put the developing institute itself to work on the substantiations. They are making it responsible for this. And here they calculate each in his own way: some promise a saving of billions, others are not able to scrape together 3 kopecks. Who, one would like to know, would believe such calculations?

The solution is to include in the plans for planning organizations the making of technical and economic substantiations of all major scientific and technical developments. And not to trust in this matter in institute economists, who are responsible mainly for the expenditures on pencils and paper. We are already trying to force on them today the estimation of the national economic impact. Here it turns out that initially the State Planning Committee decided to build a plant, and only after this is the substantiation of construction made. And then they are surprised that a 10 million ruble construction project was proposed, but it turned into a 50 million ruble project. But the next time everything is repeated. The practice, of course, is unpromising. The expert appraisal is based on reliable data. A competent organization, and no one else, should deal with the processing of these data, otherwise everyone as before will follow the shop "principles."

[Question] But scientific production associations, at which, it would seem, there are the maximum or, at any rate, considerable opportunities to shorten the distance from the origin of an idea to its practical embodiment, have been set up. Scientific production associations have proven themselves rather well. You recalled yourself Plastpolimer and its experience of introduction. Does this mean that it is possible if only at scientific production associations not to worry about the fate of the scientific reserve?

[Answer] It is necessary to take everything possible from each tested form of the organization of introduction. Only then will it become clear how apt this form is. Each such experience should be weighed. In particular, one should observe who all the same is in the lead in the pair--science or production. Why do I pose such a question when speaking about scientific production associations? Because, in my opinion, science at scientific production associations should be at the helm. Meanwhile they plan the activity for a scientific production association as an industrial enterprise. For example, annually they increase the production plan for the association, but this means that production interests unwittingly begin to prevail over scientific interests. Science contracts, experimental work is curbed, the number of

experiments decreases. And the institute in the association becomes like a reserve of an industrial shop. This discourages scientists. They begin to seek a way out of the situation. What kind? Now not introduction, but the publication of their work, the obtaining of another certificate of authorship for an invention and participation in a symposium are becoming the main one for them.

This is a harmful trend. Skilled personnel are already a guarantee that the risk in case of the introduction of developments is small, but industry is often afraid of a small risk which is obviously justified. And it turns out for the present that purely scientific problems are solved much more easily than organizational and introduction problems. The right to introduction remains on paper for many, many splendid ideas. But one cannot do without new ideas, and, hence, it is necessary to shift more boldly from respect for science, a recognized productive force of society, to the active use of this force.

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## ORGANIZATION, PLANNING AND COORDINATION

### DEPARTMENTAL BARRIERS TO INTRODUCTION OF DEVELOPMENTS

Moscow SOVETSKAYA ROSSIYA in Russian 2 Feb 85 p 2

[Interview with Hero of Socialist Labor Academician Nikolay Vasil'yevich Cherskiy, chairman of the Presidium of the Yakutsk Affiliate of the Siberian Department of the USSR Academy of Sciences, by SOVETSKAYA ROSSIYA correspondent A. Orlov (Yakut ASSR): "Unite Interests"; date not given]

[Text] On 2 February Academician N. V. Cherskiy, chairman of the Presidium of the Yakut Affiliate of the Siberian Department of the USSR Academy of Sciences, is 80 years old. By an ukase of the Presidium of the USSR Supreme Soviet for services in the development of science and the training of scientific personnel N. V. Cherskiy has been awarded the Order of the October Revolution.

On the eve of the celebration our correspondent asked Nikolay Vasil'yevich to grant a not entirely birthday interview, which was devoted to a problem which for a long time has occupied the scientist as an experienced specialist, theorist and organizer of science--the problem of introduction.

[Answer] "What is now happening at the meeting point of science and production," Nikolay Vasil'yevich says, "is in itself an unusual phenomenon. Scientists are worried not so much by the progress of research as by the process of the implementation of developments, the same questions worry production workers, they are advocating promising developments which promise a significant impact. The conversation is taking place as if in the same language, but here it is far from always possible to unite efforts and to turn word into deed.

"The solution to this phenomenon, it seems, is concealed in the rapid pace of the scientific and technical revolution. At one time, at its initial stages, from time to time arising innovations went like hotcakes and were immediately adopted by several sectors. Now the situation is completely different. An enormous number of proposals are being received, but the system of introduction has not undergone significant changes.

"The discussion on the problems of introduction has been under way for more than a year on the pages of SOVETSKAYA ROSSIYA, and in order not to repeat my colleague scientists, I will recall the basic idea: among the obstacles of introduction they name the lack of clear standardized documents, which govern economically and legally the interrelations of research organizations and enterprises, poor information supply, conservatism, departmental barriers. With all this, alas, one should agree."

[Question] "They often put departmental isolation in first place in the list of barriers. Do you believe that a general solution of the problem, which reconciles everyone, is possible here?"

[Answer] "I believe that it is possible, if in each separate case one approaches the solution from a fundamental, state position. Of course, I do not believe that 'bad' uncles, who simply do not want to trouble themselves with extra cares, sit in the ministries, although, of course, once in a while one will run across such people. But the matter is significantly more complicated."

"I will cite as an example the work connected with Yakutia. Our region is unusually rich: in its land, figuratively speaking, the entire periodic table is buried. Many deposits have already been prospected and are being developed. But is it being done efficiently?"

"For example, in the Arctic settlement of Deputatskiy a tin ore mining and concentration combine is being built. In addition to tin, other minerals, which the national economy needs very much, are contained here, but no one thought about their segregation, and the most valuable raw materials will go to the dump."

"Deposits of iron ores have been discovered in Southern Yakutia. The Ministry of Ferrous Metallurgy should deal with the deposit. But everything else, which is generously dispersed there, belongs already to the Ministry of Nonferrous Metallurgy. In general it would be correct to gather all the nonferrous metals into sulfide concentrate (technologically this is entirely possible) and to turn them over to the Ministry of Nonferrous Metallurgy. But such a means would significantly complicate and increase the cost of the operations of the Ministry of Ferrous Metallurgy. Put yourself in the place of an economist. Your ministry is investing vast assets, but the profit does not correspond to the expenditures."

"When working the deposit, mountains of barren rock will have to be stripped. From it they could extract gravel and clay and turn them over to construction workers, so that they would not haul materials from far away. But for this it is also necessary to invest 'one's own' money. Consequently, in the departmental interests it is necessary to give everything up and to observe one's own interests, having received, moreover, again praise for the economical consumption of resources. Is it surprising that these interests hang as heavy weights on the levers which hinder combined developments?"

"The trouble also is that departmental barriers frequently arise in the camp of science, which is so indignant, having perceived them in industry. Already

departmentalism is incorporated in the plan. For, when dealing with their own problems, sectorial institutes from the very start do not take into account, so to speak, 'others' minerals' and do not enlist in research and planning colleagues from neighboring organizations. Finished documents, which, as a rule, do not envisage the comprehensive combined solution of the problem, arrive at the ministry. Due to this, for example, when working deposits at times half of what could be taken efficiently is lost."

[Question] "That is, do you see the 'key' to the breakdown of departmentalism in the need for combined operations, the mandatory involvement in them of a number of ministries?"

[Answer] "Mandatory--yes, but in no case forcible. Otherwise one will not achieve either the reconciliation, about which we have spoken, or an interest in the common cause."

"Therefore it is necessary to stimulate the introduction of developments. Academician V. S. Shpak touched up this important theme in a recent publication of SOVETSKAYA ROSSIYA ("The Truncated Calculation," 18 January 1985). While agreeing with him that there are too few stimuli, I will add that we also do not know how to use flexibly and purposefully the available ones. There are more than enough facts, and take, for example, the following one. As a result of lengthy research the associates of the Institute of Geology of the Yakut Affiliate of the Siberian Department of the USSR Academy of Sciences with the participation of specialists of the Institute of the Earth's Crust of the Siberian Department of the USSR Academy of Sciences substantiated the advisability of decreasing the seismic intensity of the region of the city of Neryungri from 8 to 6-7 points on a 12-point scale. These conclusions were acknowledged by the corresponding decree of the USSR State Committee for Construction Affairs. It was calculated that with a decrease of the intensity the expenditures on the construction of projects are reduced by 15-20 percent, that is, it will be possible to save millions of rubles. And so what? Did the construction workers say 'thank you' to the scientists? By no means. They are trying in every way to use only the old calculations. This is advantageous to them. The components cost more and, hence, the amount of the fulfillment of operations, for which the wage is credited, is larger."

"Production workers frequently refuse to have anything to do with innovations which are imposed, if introduction involves renovation and a change of technologies. It is necessary, I am convinced, to stimulate these difficult periods in their activity. For example, in spite of the temporary decrease of the output of products, it is necessary to keep unchanged the material incentive fund. But if the changeover to the new means is dragged out, it is also possible to eliminate the stimuli."

"In the presence of effective stimuli various scientific and production organizations will seek each other and enter into close creative contacts, deriving mutual benefit and giving the state a substantial return."

"Scientific production associations conform in the best possible way to this task. I will note that if necessary it is also possible to set up temporary

organizations, which include several research and planning centers and a number of enterprises, which are subordinate to different departments, but are united for a specific period by a important specific problem."

[Question] "The question: Who will be in the lead in the science-production pair? frequently causes disagreements. Academician V. S. Shpak in the already mentioned publication expressed the opinion that science should be at the helm of the scientific production association. Otherwise the institute will become the reserve of a shop--nothing more."

[Answer] "This, perhaps, is the only statement of his, with which I will not allow myself to agree. Why will production without fail squeeze the interests of science? Given the proper organization of the matter such a thing should not occur."

"But I would also not want to regard the industrial base as an appendage of the scientific center. The very point of the scientific production association--association, and not a struggle for leadership--envisages the reasonable symbiosis, the equality of the partners. Bound by a common idea and common interests, they divide only the specific proportions of their participation, taking equal responsibility for the development and introduction of technologies and machines and the obtaining of the maximum end results of joint labor."

"And once again scientific production associations, which have, I am certain, a great future, require sufficiently flexible and thought out stimuli. The decree of the CPSU Central Committee and the USSR Council of Ministers 'On Measures on the Acceleration of Scientific and Technical Progress in the National Economy' is aimed at the solution of many introduction problems, including the problems of the material stimulation of collectives of innovators."

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## ORGANIZATION, PLANNING AND COORDINATION

### ENGINEERING CENTERS FOR IMPLEMENTING NEW SCIENTIFIC IDEAS

Moscow PRAVDA in Russian 3 Jan 84 p 2

[Article by President of the Ukrainian SSR Academy of Sciences Academician B. Paton (Kiev): "Engineering Centers"]

[Text] Considerable experience of the successful cooperation of scientists with production personnel at various levels has been gained at the Ukrainian SSR Academy of Sciences. Special attention at the Ukrainian SSR Academy of Sciences in recent years has been devoted to technologies as the most perfect form of the implementation of the results of basic research.

Experience shows that the implementation of fundamentally new scientific ideas, which are capable of causing fundamental changes in existing production, is accompanied by great difficulties. This is due to the fact that for a number of objective reasons the sectors in a number of cases are not ready to implement truly revolutionary scientific and technical achievements. This applies first of all to developments which have application in many sectors. The most important national economic tasks are of precisely such a nature. They require the solution of a wide range of problems, which go beyond the interests of a single ministry, the organization of effective scientific and technical cooperation, in which the production capacities of all interested ministries and departments are enlisted, the organization of maintenance and the training of specialists.

At present our country has a significant number of important completed scientific and technical developments, the immediate large-scale use of which would give a mighty impetus to the further development of the national economy. However, their advance into production is frequently dragged out so much that many developments become obsolete, never having provided a real economic return. At the same time, getting abroad, the results of our developments are used very efficiently. As a result at times it is necessary to purchase abroad materials and equipment, which are produced in accordance with our licenses.

All this attests that the system of introduction, which is objectively oriented for the most part toward the improvement of operating works, cannot always ensure the mass realization of scientific developments in equipment and technology. Therefore the need is arising for the development of special

organizational forms, which conform to the complexity and scale of the tasks of introduction and ensure the engineering and technical embodiment of truly innovative achievements. At the Ukrainian SSR Academy of Sciences special problem-oriented subdivisions, which received the name of engineering centers, have been formed.

Their establishment becomes especially necessary, when goal-oriented basic research has already led to specific results of great practical importance and when their implementation is not backed technologically and technically by operating production and the appropriate staffs of specialists are lacking.

Engineering centers can be established only at those institutes which have an adequately developed pilot production base. At the Ukrainian SSR Academy of Sciences such institutes together with their cost accounting organizations have been transformed into scientific and technical complexes (NTK's). The existence within them of a developed experimental design and production base makes it possible to conduct intensively goal-oriented basic research and to carry out the careful development of new technologies and their preparation for broad introduction, to develop various materials, instruments, machines and equipment. This makes it possible to speed up drastically the process of the practical use of scientific and technical innovations and for the most part ensures the improvement of the formed system of production.

At present five engineering centers are operating at the Ukrainian SSR Academy of Sciences. At the Institut elektrosvarki imeni Ye. O. Patona Scientific and Technical Complex there are three of them: pressure welding, electron beam technology and the robotization of the production of welded components. At the Institut kibernetiki imeni V. M. Glushkova Scientific and Technical Complex there is the engineering center of microelectronics, while at the Institut sverkhtrverdykh materialov Scientific and Technical Complex there is the engineering center for the development of equipment of high pressures and temperatures for the obtaining of new materials.

In spite of the difference of the problems being solved, the activity of the engineering centers is based on similar organizational structural principles. A number of divisions of the design and technological bureau of the scientific and technical complex, which work in direct contact with the corresponding scientific subdivisions of the institute, are a part of the center. The production capacities of the pilot works or pilot plant of the scientific and technical complex are attached to each engineering center. The chief of the science division, in which research in accordance with the specialization of the center is conducted, carries out the scientific methods supervision of the engineering center. The production associations and enterprises of various ministries and departments, which act either as the clients of its products and services or as producers of the latest production equipment and materials, which the center needs, and, if necessary, also the corresponding foreign trade organizations are the "external environment" of the engineering centers. Of course, the engineering centers work in close cooperation with related scientific research and planning and design organizations.

The engineering centers engage in the thorough study of the needs of the national economy for technological and technical developments, the

determination of the sectors, in which their results can be used, the production on their own or on the basis of cooperation of single specimens and pilot series of the latest equipment, instruments and materials, the preparation of planning and design documents for the broad introduction of the latest technologies and the provision of scientific, technical and consultative assistance to ministries, production associations and enterprises in the determination of the technological policy of introduction, the assimilation and use of innovations, the establishment of service subdivisions and so on.

The close creative cooperation of scientists of the institute, designers and process engineers of the experimental design and technological bureaus and the workers and engineers of the pilot works on the basis of a unified thematic plan makes it possible in the shortest possible time to develop and test assemblies, control systems and technological processes.

Thus, the engineering centers ensure the successful conducting of goal-oriented basic research, the increase of the level of developments and the prompt introduction of their results on the scale of many sectors in the most important directions of scientific and technical progress.

The possibilities of the successful solution of the complicated scientific, technical and organizational problems of the extensive industrial assimilation of fundamentally new technologies are clearly traced on the basis of the activity of the engineering center of electron beam technology of the Institut elektrovarki imeni Ye. O. Patona Scientific and Technical Complex. The center is ensuring the introduction in the sectors of the national economy of fundamentally new technologies and materials, which were developed on the basis of the basic research of the physical chemical laws of electron beam melting and the vaporization of inorganic materials in a vacuum. It carries out the operational development of equipment and technology, monitors the operation of the shop of electron beam technology of the pilot plant of the Institute of Electric Welding imeni Ye. O. Paton, which produces in accordance with the orders of industrial enterprises prototypes of materials and items, prepares suggestions and gives the necessary technical and consultative assistance in the organization of cooperated industrial production with the maximum enlistment of the production possibilities of a number of ministries.

The results of these operations, which were commended by the Lenin Prize and the Ukrainian SSR State Prize, are already being used at more than 40 enterprises of 8 ministries and in many ways determine the scientific and technical level of production, especially in machine building. The broad assimilation in the national economy of electron beam technology is making it possible to save tens of millions of rubles a year.

The activity of this engineering center made it possible to broaden significantly the contact with industry, to organize the training of skilled personnel and to shorten by several fold the time of the introduction of completed developments. As a result of this the science department of the institute obtained the opportunity to entrust to a significant extent the task of the broad introduction of its scientific results to the collective, which was specially oriented toward this work, and to focus its attention on the



solution of new scientific problems. Moreover, the emerged stable "feedback" with industry is enabling the scientists to realize more clearly the needs of production in this area and to generate new scientific ideas.

The progress of the electronics industry depends in many ways on the extensive complete automation of the processes of the designing, development and production of items of microelectronics and means of microprocessor engineering. The introduction of the automatic control systems for the formation of an image in thin films, which were developed at the Institute of Cybernetics imeni V. M. Glushkov of the Ukrainian SSR Academy of Sciences, made radical changes in the technological process and made it possible not only to ensure the obtaining of practically entirely flawless images, but also to eliminate the presence of man--the operator in the work zone. This result is one of the significant steps toward the development of unmanned works.

The efforts of the engineering center of microelectronics, within which about 250 people work, are aimed at the solution of all these problems. It is natural that the effectiveness of the research of the engineering center in many ways is governed by the close cooperation of the scientists and the personnel of organizations and enterprises of the Ministry of the Electronics Industry, which is being strengthened first of all by the mutual interest in the achievement of a qualitatively new level of production technology. The development of an versatile automated production system of extra large integrated circuits on the basis of automated shops is envisaged by the joint operations on the automation of the production and designing of items of microelectronics, which will make it possible to increase labor productivity by not less than 2.5-fold, to decrease the number of workers to one-third and the production areas to one-fourth with a significant reduction of the labor intensiveness and power-output ratio of production. In turn the efficient work of the engineering center of microelectronics is contributing to the concentration of the efforts of scientists on the solution of the most urgent problems of the electronics industry, including the shortening of the time of the development and transfer to industry of new highly productive computer equipment.

At the same time the limited number of engineering centers cannot cover fully all the problems of the introduction in the national economy of major scientific and technical achievements and have a decisive influence on the acceleration of scientific and technical progress as a whole. A number of fundamental problems of the functioning of engineering centers as a component of the mechanism of the acceleration of scientific and technical progress require solution.

In my opinion, similar engineering centers can be established within the largest scientific institutions of the country, which have a large reserve of basic and applied research, hold leading positions in the country in a specific scientific direction and have a developed design and technological and pilot production base. Some of them could study the problems of machine building, others--questions of power engineering, still others--construction and so on.



It would probably be useful if the USSR State Committee for Science and Technology and the USSR State Planning Committee would consider and settle the question of the establishment of cost accounting engineering centers for the introduction of the most important intersectorial scientific and technical developments. The corresponding state documents, particularly the standards of the system of the development and placement of a product into production, also need revision.

The engineering centers need the special-purpose allocation of assets from state reserves for the assurance of the introduction of the results of scientific and technical developments, the assimilation of which involves the reorganization of production and the establishment of new enterprises, shops and sections. The corresponding measures on the changeover of the engineering centers to the system of material and technical supply, which is in effect at the enterprises of industrial ministries, are also required.

Addressing the meeting of the Politburo of the CPSU Central Committee, General Secretary of the Party Central Committee Comrade K. U. Chernenko noted that "in our times the basis of effective development is the extensive introduction of the achievements of science and technology in production." The engineering centers can play an enormous role in this great matter.

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## ORGANIZATION, PLANNING AND COORDINATION

### PROBLEMS IN FINDING PRODUCERS OF TECHNICAL INNOVATIONS

Moscow IZVESTIYA in Russian 22 Jan 85 p 2

[Article by Doctor of Technical Sciences Professor I. Markhisan, head of the Chair of Physics of the Ufa Petroleum Institute: "Why Is It Easier to Invent Than to Introduce?"]

[Text] A letter from Feodosiya arrived here at the Ufa Petroleum Institute. The managers of the commercial port, the captain and senior mechanic of the motorship "Krym" wrote very nice things about the device which was developed at our chair. Installed on the ship, for 4 years now it has been removing from the water all sorts of contamination which is connected with navigation and other economic activity. The electric flotation device is compact--it is no larger than a magazine table. It weighs 100 kg. It uses as much energy as an electric iron. It cost the client only 1,000 rubles. It is reliable in operation even up to moderate rolling. And all this is with the main thing--the high degree of purification of the water.

In the letter there was also a request to the institute, which was supported by the Feodosiya City Soviet Executive Committee: to produce for the needs of the city and the port if only a few more such devices (the need for them is estimated in the tens, even hundreds). If only this request were the only one! Hundreds of letters of various enterprises, organizations and departments have already piled up at the chair: they would all like to receive devices.

In recent years units, which are different in technological arrangements and productivity, have been developed at our chair: they can remove petroleum products, greases, proteins and other substances from 10 to 500 m<sup>3</sup> of liquid a day. Now we are making a 700-m<sup>3</sup> device, so that there will be devices for practically any scale and type of pollution.

But just where are our devices in operation, besides the motorship "Krym"? At the Davlekanovo Motor Vehicle Repair Plant of the Bashkir ASSR State Committee for the Supply of Production Equipment for Agriculture, on a special barge on the Belaya River, at the Ufa Plant of Textile Glass Fiber and at a special motor vehicle center of the Volga Motor Vehicle Works in Ufa. That is all, it seems. Not very much! Especially as the units operate with great efficiency. At the motor vehicle repair plant the annual saving is 647,000 rubles. While

the use of the device in the basin of the Belaya River, as the economists say, has prevented harm which could have come to 700,000 rubles a year. In one of the certificates on the results of chemical analyses the laboratory of the republic sanitary and epidemiological station noted: petroleum products were not detected after the purification of waters by the electric flotation device.

With respect to several specific qualities there is nothing to compare our creation with, because a similar small inexpensive purification device simply does not exist. Foreign purification units for sea-going ships--the United States, the FRG, France and England produce them--are very expensive, and at the same time after them there are tens of times more residues than after our device.

I am relating all this not for advertisement--the devices are already quite well known, are protected by certificates of authorship, have patent cleanness and have been awarded medals and diplomas of a number of all-union and international exhibitions. However, can the collective of authors experience satisfaction, if its development, the efficiency and necessity of which do not raise doubts, exists in only a few copies? Everything, from the idea to the last bolt, is done by the forces of the chair. But does the chair of a higher educational institution have many resources--technical and material?

I repeat: hundreds of letters are coming to us. Everyone is asking for a finished device. As if they are appealing to a plant, and not an educational institute. And no one wants to set up its production.

It would seem that it is reasonable for the ministries of the river and maritime fleet and the fish industry to display an interest in the electric flotation device. Several years ago they were among the 34 sectorial ministries to receive advertising prospectuses of the innovation. Then a meeting of the collective of authors with representatives of these ministries was held. We showed mock-ups of the devices and the results of their pilot and industrial operation. Again there was no shortage of favorable appraisals. But as soon as the talk touched upon practical steps on the organization of the production of the electric flotation devices, the conversation immediately came to an end. Even such a harmless thing as the transfer to the institute of capital for the organization of a design bureau and workshops frightened the ministries.

We tried to take a different route. It is well known that the Leningrad Institute of Water Transportation Engineers (LIIVT) has been working for a long time on designs of purification devices for river-going ships. The institute is an educational one, in the system of the RSFSR Ministry of the River Fleet. Here there are a design bureau and its own powerful technical base with test beds. Why should we not unite efforts in the accomplishment of a single goal? Professor S. Zubrilov, prorector of the Leningrad Institute of Water Transportation Engineers for scientific work, twice came to us with his associates and saw our device in operation. It created on him, judging from his comments, a most favorable impression. And our workers went twice to the Leningrad Institute of Water Transportation Engineers. But cooperation did not come of it.

And we tried another route. With great difficulty, but in the end I got a reception with RSFSR Deputy Minister of Higher and Secondary Specialized Education and General Director of the cost accounting scientific association of the RSFSR Ministry of Higher and Secondary Specialized Education (now already the former one) E. Kalinin. I raise the question of allocations for the further improvement and introduction of the device. And without a pause a rejection: the ministry and association, he says, do not have the assets. I am a front-line soldier--I am not used to retreating. The conversation shifted to lofty tones. As a result a small, obviously inadequate sum was all the same allocated to the chair.

The same E. Kalinin after two articles of the newspaper SOVETSKAYA BASHKIRIYA in a response to the editorial office wrote: "...Jointly with the Ufa institute the association will consider the possibility of setting up at the institute a pilot design bureau or a department with the corresponding experimental works. However, this will be possible only on the condition of the allocation to the association of the corresponding financial and material resources, as well as limits on labor by the interested sectorial ministries or by the USSR State Committee for Science and Technology or the RSFSR State Planning Committee. The association supports the suggestion of the newspaper on the advisability of the placing of orders for the production of devices at enterprises of Bashkiria, which, undoubtedly, will contribute to the quickest introduction of the electric flotation devices of the Ufa Petroleum Institute in the national economy and the successful solution of the problem of maintaining the cleanness of water resources." These lines were written nearly 5 years ago. Much water has flowed under the bridge since this. And for the most part, as before, polluted, untreated water.

At one time the Bashkir ASSR State Planning Committee was interested in our development. Its authoritative commission observed the devices in operation. I was invited to prepare a speech to the Collegium of the Bashkir ASSR State Planning Committee. How could one not take advantage of such an opportunity! For the State Planning Committee of the autonomous republic is precisely the organ in the region, which could, having collected the assets being allocated to enterprises for nature conservation (moreover, considerable assets, but assets which are not always used intelligently), set up the production of much more complicated equipment as well. It could establish for this purpose an intersectorial laboratory or something like a cost accounting enterprise for the designing, production and introduction of the above-described devices.

The staff of such a firm is sufficient within the limits of 100 people. This is a group of researchers and developer-designers, a group of mechanics who are the producers of the basic assemblies of the device and a group for introduction, which consists of adjusters who install the device at the site of its operation, start it up and train those who have to attend it. With such considerations I prepared to speak to the Collegium of the republic State Planning Committee. But to this day I have not gotten an invitation.

Thus, the device is needed. It is needed in different versions--depending on the nature of production and the discharges. It is needed in thousands, tens and hundreds of thousands of copies. Moreover, it is extremely simple, does not require any special materials and can be made even in an ordinary machine



workshop. However, among the most powerful and interested departments there is not one which wants to tackle the production of such a simple device.

And it is also possible to understand them. Each has its own worries, and first of all the plan. The assimilation of an innovation "from elsewhere" is not supported with anything--either assets or resources. This matter is not stimulated in any way. Who would divert for it forces and assets to the detriment of the basic program? Perhaps, among some departments if desired the means and assets would be found, but here not the economic mechanism, but the outlook of specific officials, on whom the putting to use of forces and assets depends, comes into action. So far enthusiasts, who look farther than today's plan, have not been found.

When we turned to the director of the planning and design bureau of the USSR Ministry of the Maritime Fleet, in responding he was guided by the following at least strange logic: Why should we bother with your devices, if they do not have analogues either in our country or abroad? Moreover, the latter was especially emphasized--if there is nothing similar abroad, your device is also not needed. But if it is needed on ships, let the Ministry of the Shipbuilding Industry deal with it. We turn to the Ministry of the Shipbuilding Industry. But this ministry, it turns out, would also like only to place an order and to receive the devices in ready form and in the required quantity.

We also knocked on many other doors, although it would have been better to spend this time on the development of new ideas. As a result we were convinced: the mechanism of the introduction of innovations of technology has not been adjusted here--both in the region and on the scale of the country. We are judging not only from our own experience. It is possible to cite examples from the practice of other Ufa higher educational institutes, when our colleagues, having developed a new instrument or unit, end up in exactly the same situation. Such is the situation, for example, with the electrostatic field meter, which was developed at the Chair of Experimental Physics of Bashkir University (this, incidentally, IZVESTIYA also reported recently). It is a very necessary instrument. But it is unknown when it will be placed on line and by whom.

Comrade K. U. Chernenko wrote precisely about such a situation, which is no longer tolerable, in his article "To the Level of the Requirements of Mature Socialism" in the journal KOMMUNIST: "...when the forms and methods of management, which formed and justified themselves in the past, arise as an obstacle in the way of new equipment, they do not allow it into the shop. Hence there can be only one conclusion: the effectiveness of all our troubles for the qualitative transformation of productive forces depends on whether we will be able to make the corresponding changes in production relations." Further Konstantin Ustinovich speaks about the need to create a universal economic interest in the introduction of new highly productive equipment.

One of the ways of implementing this principle would be, in my opinion, the development of a network of pilot works (or firms for introduction, which were spoken about above, the point is not in the name) in the system of the State Committee for Science and Technology or according to the regional principle of

subordination, say, to the council of ministers of the union or autonomous republic, the kray or oblast soviet executive committee. These works or firms would be interested in taking from scientific collectives some development or prototype or another and bringing them more quickly to the conveyor. Science, including science of higher educational institutions, should have sufficiently powerful pilot testing areas for the development of its ideas, for their embodiment in metal and for introduction in production. Then the path from the idea to the item, from laboratory developments to the conveyor will be shortened.

I believe that there is no need to prove that science of higher educational institutions has an enormous creative potential. For example, our institute performs cost accounting operations worth 6 million rubles a year. But we could do 9-10 million rubles. The limits on labor are checking us. The output of each associate of ours exceeds by two- to fourfold the productivity of a worker of another sectorial scientific research institute. A worker here performs work worth 10,000-14,000 rubles a year. At several sectorial institutes I know it is 2,000-3,000 rubles. But how much poorer our technical base is!

The latter circumstance cannot but affect the fate of an idea, an innovation and developments, which originated within the walls of academic higher educational institutions, and cannot but lengthen their path into production. And since this is so, it would be advisable to redistribute somewhat the assets being released by the state for science--to give a little more to the best higher educational institutions and academic institutes at the expense of the sectorial scientific research institutes, which for years have not been answering the questions being asked by practice, that is, wherever there are a substantial scientific potential and a good reserve of basic ideas and developments, which are awaiting immediate introduction in production.

And there is another thing. The path of an innovation, the path from the idea to the series-produced item is too drawn out in time--it takes at times up to 10 years. Does it not cost the state too much? For during this time both science and practice will move far ahead. And again it will be necessary to catch up and to pay through the nose for a license for the production of a similar item, which was assimilated more rapidly abroad than by us.

Above I spoke mainly about the need to find such stimuli, in case of which ministries, departments and enterprises themselves would seek innovations. Yes, new stimuli are needed. But responsibility is also needed. Is it not time along with the creation of an economic interest in an innovation to be concerned about the establishment and strict observance of the personal, if you wish, juridical, legal responsibility of officials? If you have dismissed a worthwhile idea, the introduction of a valuable innovation and have dragged out the time unjustifiably, you will be accountable for this before the law. Because--and these are not big words--you have done harm to the state.

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## BUDGET AND FINANCE

### INCENTIVES FOR DEVELOPERS OF NEW PROCESSING METHODS

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[Article by V. V. Starovit and A. S. Kolesnikov: "On the Stimulation of Inventors of New Processing Methods"]

[Text] Questions of strengthening the material interest and increasing the responsibility of workers of science, designers and process engineers for the acceleration of the introduction of scientific and technical achievements in production are examined in the article. The shortcomings of the stimulation of authors of fundamental technical innovations are analyzed and steps on the improvement of the procedure of paying rewards to the developers of new processing methods of a high scientific and technical level are proposed.

The problem of stimulating the authors of inventions, which become the basis of a fundamentally new processing method, is becoming especially urgent in light of the decree of the CPSU Central Committee and the USSR Council of Ministers of 18 August 1983, "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy." The difficulties of stimulating such inventions are connected with the fact that it is impossible to determine exactly the economic impact of their use. It depends not only on the change of the properties of the basic invention as it is used, but also on additional and associated inventions, the increase of the organizational and technical level of production and the increase of its scale.

The difficulty of delimiting the economic impact and attributing it to one invention or another is one of the reasons. Here such factors as the process of the development of equipment, the development of associated sectors (which leads to a change of the prices for raw materials) and to a certain extent psychological factors are of importance. Assume that several varnishes of approximately equal value in the technical and economic respect are produced. Let us assume further that an invention was made in the area of the production of raw materials for a specific varnish, as a result the varnish became much less expensive than its analogues. In this case the invention of the method of obtaining raw materials for the varnish is considered the source of the

impact. Another situation is possible: raw materials, from which a varnish less expensive than the analogues was developed, were obtained within the traditional processing method. In this case the impact should be attributed to the invention of the varnish. Finally, it can happen that the inventions of both the varnish and the method of obtaining raw materials for this varnish were made simultaneously--in this case the differentiation of the impacts is very difficult and frequently is of a subjective nature.

The basis of the objective differentiation of the impacts and the distinction of the economic impact, for which the most important inventions account, can be adopted from the practice of world trade in licenses and the economic practice of several socialist countries, in which the invention is attached to a specific organization of the socialist sector and is an object of the cost accounting relations which exist between socialist organizations.

The point is that in science-intensive sectors, for example, the development of a processing method on the basis of a major invention requires during the initial period, which takes up more than a year, large expenditures of labor and resources, which are not recovered, that is, their economic impact is small; subsequently in case of the assimilation of the processing method in mass production the improvement at times of even insignificant parameters can yield a large and precisely defined impact. According to the data of the Central Statistical Administration, work on efficiency promotion gives the national economy the greatest economic impact, although in science-intensive sectors it practically does not have an influence on the technical level of the basic processing methods.

One of the most important indications of the value of an invention is the sale of a license for it and extensive use in technically advanced countries. The sale of a license alone does not always confirm the value of an invention, since many original inventions do not receive extensive use owing, for example, to rapid obsolescence.

At present the reward for an invention, which provides a saving, is paid to the author in the course of 5 years from the start of the use of the invention in the national economy in the amount of 2 percent of the saving obtained during each calendar year. The maximum reward can come to 20,000 rubles. If a license is sold for the invention, the author can receive up to 3 percent of the received amount, but within the limits of the same maximum reward. Guarantees of the receipt by the author of the maximum amount of the reward for a major invention do not exist, which decreases the effectiveness of the system of the stimulation of developers of innovations.

If the determination of the economic impact is difficult, the reward is established in conformity with the Instructions on the Determination of the Amount of the Reward for Inventions and Efficiency Proposals, Which Do Not Create a Saving (which were approved by the State Committee for Inventions and Discoveries in 1974). The amount of the reward (in rubles) is determined in the following manner:

$$B = K_1 \times K_2 \times K_3 \times K_4 \times 20,$$



where  $K_1$ ,  $K_2$ ,  $K_3$ ,  $K_4$  are the coefficients respectively of the achieved positive impact, the extent of use, the complexity of the solved technical problem and the significant differences.

$K_1$  assumes values from 1 (the improvement of secondary technical characteristics) to 5 (a new technological process, which has been assimilated in the national economy for the first time and has qualitatively new characteristics).

$K_2$  has 10 levels--from 1 (use at 1 enterprise in custom production) to 8 (use in mass production at 10 and more enterprise).

$K_3$  assumes values from 1 (the development of the design of one simple item, the change of one parameter of a simple process or one component of a formula) to 6.5 (the development of a design, technological process and formula of particular complexity, which pertain mainly to new sections of science and technology).

Let us examine the values of  $K_4$  in more detail.

According to the indicated instructions an invention, which is characterized by significant differences and does not have a prototype, that is, a pioneer invention, which solves a problem in a fundamentally different way, receives a value equal to 4; an invention which has a prototype which coincides with the new solution with respect to the minority of basic attributes--3; with respect to half of the basic attributes--2.5, with respect to the majority--2. An invention, which consists in the discovery of a new set of known technical solutions which create a new positive impact, receives the value of 1.5, while in the use of known means--1.25.

The above-cited formula of the determination of the value of an invention and the individual indicators included in it leave significant possibilities for the effect of subjective factors. The actually uniform distribution of the magnitudes of the coefficients over the entire interval of possible values is not very sound. The use of identical intervals of the changes of the different coefficients is illogical. The cause-effect relation of the factors, which are reflected by the used coefficients, is not taken into account.

Indeed, in the formula the indicators, which characterize the causes and effects of the value of inventions, are placed on the same level. The achieved positive impact ( $K_1$ ) is an effect of the extent of use of the invention ( $K_2$ ); the complexity of the solved technical problem ( $K_3$ ) is frequently connected with the essence of the differences of the technical solution and so on. It is well known that the product of dependent values cannot give the correct result. But let us look at the partial coefficients.

When determining the value of  $K_1$  it is difficult to decide, which technical characteristics are basic, and which are secondary, especially if small parts, and not complex objects of equipment, are the innovation. When determining the maximum values of this coefficient it is taken into account that the product is being assimilated in the national economy for the first time, but

it is not taken into account whether the invention is the basis of the product or serves for its improvement. It is impossible not to agree with the fact that the influence of the invention on the competitive ability of the product is not taken into account. A product, which has the maximum value of the coefficient  $K_1$ , should in its basic quality surpass the best foreign models, while in case of slightly smaller values should correspond to the level of these levels. In our opinion, a new product or processing method, to which the maximum value of  $K_1$  is awarded, should be the basis of qualitatively new generations or series, should ensure a significant increase of the technical level of production in the user sectors and should be competitive on the foreign market.

At present an objective determination of the value of the coefficient of the extent of use  $K_2$  is hardly possible. It is impossible to approach unambiguously the determination of its value for rolling mills and small parts, which can be used for the needs of a specific enterprise and can be produced in small batches. The means to the solution of the problem is seen in the elaboration on the basis of these instructions of sectorial methods, which take into account the specific nature of the sectors. When improving the methods of determining the value of  $K_2$  it should be taken into account, to what extent the use of the given invention makes it possible to meet more completely the needs of the national economy and to exclude analogous inventions. Apparently, the possibility of the production of the product for export and the use of the Soviet invention abroad should also be taken into account.

When determining the value of the coefficient  $K_3$  they use an approach, the fallacy of which consists in the fact that the complexity of the means of solving the problem is illegitimately identified with the complexity of the problem itself. For example, an entire set of measures can be used for controlling some agricultural pest, starting with the chemical and physical chemical treatment of the crop and the planted areas up to the special treatment of storehouses and the development of the corresponding devices. But it is not ruled out that it is possible to solve the problem, having discovered a biological enemy of the pest, and then the complex technical problem will be solved by a simple means, but most effectively. But according to the existing regulations  $K_3$  will have the minimum value.

At one time the problem (complex task) of relieving the pain of surgical operations was solved by the use of such a simple substance as ether, and if we take into account the complexity of the chosen means, the value of  $K_3$  should be minimum, but if we proceed from the complexity of the solved problem, it should be maximum. Consequently, as a whole the set of estimates of  $K_3$ , in our opinion, should be formed with allowance made not only for the chosen means of solving the problem, but also for the complexity of the problem itself, as well as the effectiveness of parallel means of its solution.

The value of  $K_4$  should reflect the creative level of an invention, the extent of its originality and unobviousness. The originality of an invention is not identical to its value, but abroad it is easier to obtain patents, which are hard to dispute, for original inventions. Let us recall that in world patent

practice--in the practice of the FRG, Japan and several other countries--the division of the results of creative technical work into more original results (inventions) and less original results (useful models) is also envisaged, and this is done in the process of the patent appraisal. A more detailed division in accordance with this, quite subjective, criterion in principle seems possible to us, but the division of the technical solutions, which are recognized in the USSR as inventions, into six groups according to the level of creativity and the unobviousness of the solution is hardly advisable and valid.

According to prevailing appraisals, the minimum level of creativity is always characteristic of an invention "for application." Such an appraisal is justified only in a few cases. Such inventions, as a result of which a previously unknown unobvious useful area of application is found in an known object, are grouped with inventions for application. The authors of the instructions when establishing the appraisal of an invention for application based themselves on the fact that it is simpler to find a new area of application of an already known object than to develop a new object with useful properties (in a number of cases this is actually so). Meanwhile Swiss chemist Muller discovered only the biological activity of DDT (and received for this the Nobel Prize) at the time when the substance itself was already known, and, consequently, according to the existing regulations, this discovery should have been considered an invention for application. Diverting our attention in this case from the advisability of the application of DDT in light of current data, let us note the undoubtedly high creative level of this discovery and its value. In exactly the same way the discovery by Morton of the narcotic effect of ether should be recognized as an invention for application. It is interesting that the American patent system of that time was sluggish, and the U.S. court rejected the issuing of a patent, having called it in so doing the greatest benefactor of man. The use of sulfur (an object known for a long time) for controlling fungous disease of vineyards--undoubtedly a major invention, with a high creative level of the solution--was recognized as an invention for application.

The mechanistic approach to the rules of determining the creative level of a solution concerns not only inventions for application, but also all other inventions--when appraising their creative level it is proposed to proceed only from the structure of the formula of the invention, and not from the solution itself. However, the structure of the formula of an invention reflects the creative level of an invention only indirectly and far from always; judging by the formula, it is possible to speak definitely only about the preconditions of a low or high level of creativity.

The amplifications of the instructions on the rules of determining the creative level of an invention in the area of chemistry and microbiology merit special attention. For all inventions in this area--substances obtained by chemical means, new strains of microorganisms--the value of the coefficient of significant differences is assumed to be equal to 2, that is, these inventions have the third creative level of the six existing ones. Substances with a fundamentally new structure, for which the highest creative level is predetermined, constitute the exception. However, such inventions make up a negligible portion of all inventions and are used not by themselves, but only



when an area of useful application, which is similar to the traditional area (in which substances of known classes are used with the obtaining of a similar impact), is found.

It seems that the procedural principles of determining the values of the coefficient of significant differences have been carried over mechanically to inventions in the area of chemistry and microbiology. Let us recall, for example, that Nobel prizes were awarded for works connected with penicillin, according to the rules now in effect the strain, which is the producer of penicillin, would receive the third creative level.

A major procedural error of the prevailing rules of determining the creative level consists in the fact that the very substance, which was obtained by chemical means, or the new strain of microorganism is regarded as an invention. In reality the essence of creativity usually consists in the discovery in a substance or strain of unforeseen useful properties, and the more valuable these properties are, the higher its level is. Therefore it is impossible to agree with the inclusion of all inventions of this sort in the same group according to the level of creativity.

Quite often the same substance or microorganism can have two and more areas of application, that is, several inventions can be connected with the same object (for example, pyramidon--a headache remedy which everyone knows--can also be used as an additive to technical-grade oils). If both inventions are made not on the same day, and this is the most likely version, the first inventor will receive a certificate of authorship for the discovery (invention) of the substance or strain, while all other inventors will receive certificates of authorship for the use of the substance or strain.

It is easy to notice that the differentiation of inventions--into a substance, a strain and their application--is often of an artificial nature and depends on random events, and not on the creative level and value of the invention. Let us note that abroad a departure from such a practice is presently being observed, and ordinary patents, and not patents for application, are being issued for already known substances (objects).

In 1983 the State Committee for Inventions and Discoveries drew up a draft of new instructions on the determination of the amount of the reward for inventions and the procedure of its payment. In conformity with the draft of the instructions the amount of the reward is determined according to the formula:

$$B = K_1 \times K_2 \times K_3 \times 10,$$

where  $K_1$ ,  $K_2$ ,  $K_3$  are the coefficients respectively of the significance of the set of essential attributes of the invention in the object of equipment, technology; the difference of the invention from the prototype; the extent of use of the invention.

As is evident, the number of coefficients has been reduced to three. The coefficient of the extent of use did not undergo fundamental changes. It is possible to assert that the coefficient of significant differences has been



transformed into the coefficient of the difference of inventions from the prototype, while the coefficients of the achieved positive impact and the complexity of the solved technical problem were merged into one--the coefficient of the significance of the essential attributes of the invention in the object of equipment, technology.

The introduction of the new coefficient  $K_1$  is an attempt to define inventions and the coefficients concretely. The drawback of such an approach consists, in our opinion, in the fact that it is impossible to take fully into account all the spheres of inventing activity. Moreover, it is difficult to compare and contrast inventions which have been made in different sectors.

Thus, in case of the use of the new coefficient  $K_1$  high molecular organic compounds, inorganic compounds and organic chemical compounds will differ without adequate grounds in the value of the coefficient by twofold. This coefficient is also lower for strains of microorganisms, although by means of strains of microorganisms in genetic engineering it is possible to solve problems, which are most different in complexity and importance, including to obtain rare and very valuable high molecular organic compounds and organic chemical compounds. Hence, the assignment of all strains to one group without consideration of the problems, which are solved by means of these strains, cannot be justified.

The previous shortcomings of the approach to the appraisal of inventions for application have been preserved.

The coefficient, which characterizes the differences from the prototype, in its function and principles of evaluation does not differ drastically from the former coefficient of significant differences. Whereas the ratio of the number of attributes, which are common and differentiate the invention from the prototype, was of decisive importance for the determination of the value of the coefficient of significant differences, when determining the value of the new coefficient an attempt is made to evaluate the level of creativity when developing the invention and the nature of the obtained result.

However, rules of determining the creative level of strains are not envisaged in the draft of the instructions. Significant difficulties are encountered when determining the value of the coefficient for substances, since it is difficult to determine the differences between the maximum and minimum value of the coefficient. When determining the level of creativity one should proceed from the useful function, which has been established in the substance, and the useful result, which is obtained in case of the use of substances. This factor is not taken into account in the newly formulated rules of determining the creative level.

In conformity with the instructions on the procedure of the payment of the reward the amount of the one-time incentive reward is established at 20 to 200 rubles per invention, but not more than 50 rubles per person. The amount of the one-time incentive reward is determined on the basis of the urgency and difficulty of the technical problem, which is solved by the invention, and the positive impact, which can be obtained as a result of the use of the invention. With respect to inventions, which have been developed at

organizations which operate as a voluntary service, the degree of elaboration of the technical specifications for the given invention is also taken into account. Greater detailing of the rules of the payment of the incentive reward is lacking.

The stimulating effect of the incentive reward is of a contradictory nature. On the one hand, the work connected with the submitting of applications for an invention should be stimulated, especially in those instances when the introduction of the invention and the obtaining of the reward for the use of the invention are delayed for an indefinite period, while the authors of the invention are involved in labor-consuming and unaccustomed work for them on the patenting of a Soviet invention abroad.

On the other hand, the amounts of the incentive rewards at times exceed the possible payments for the industrial use of inventions. Their equation with publications is not the last stimulus to the obtaining of certificates of authorship and the incentive reward.

The amounts of the incentive rewards depend on the practice, which has formed at organizations, and the state of their incentive funds. The stimulation of the number of developed inventions has the result that in case of the submitting of applications the inventions are divided into components and the number of submitted applications is thereby artificially increased. Therefore the giving up of the payment of an incentive reward would be justified, although the stimulation of work, which is connected with the patenting of inventions abroad, should be introduced.

The prevailing Statute on Discoveries, Inventions and Efficiency Proposals envisages the payment of bonuses for promising inventions, which should be carried out by ministries and departments. However, in practice instances of the payment of such bonuses are not known, apparently, due to the fact that they place great responsibility on the executives of ministries and departments. Moreover, criteria of future utility in practice are lacking. In our opinion, the All-Union Scientific Research Institute of State Patent Examination of the State Committee for Inventions and Discoveries could prepare an answer to the question of the payment of the incentive reward at the expense of the corresponding ministries. The absence of a departmental approach to the solution of this problem on the part of this organization and the existence of a staff of skilled experts are a guarantee of success.

Thus, great shortcomings are characteristic of the existing rules of determining the actual value of inventions. They require of the manager of an enterprise a broad technical outlook and special skills and place great responsibility on him. The transfer of this responsibility to commissions, which are created specially for the payment of the reward (see, for example, [1]), does not solve the problem. The rules of determining the actual value are vague. In practice this has the result that a large number of factors: the number of authors of the invention, their official position, the state of the stimulation funds of the paying organization, influence the amount of the reward, which is determined in accordance with the actual value. The main thing is that the existing procedure of determining the actual value is divorced from the national economic mechanism.

It is possible to increase the effectiveness of the system of stimulation, if it is included to a greater extent in the national economic mechanism. The staff of the State Committee for Inventions and Discoveries, which is skilled and least susceptible to the influence of departmental interests, and its patent experts can make the appraisal of the creative level of inventions. The rules of determining the coefficient of the creative level in case of their centralized application will acquire the necessary precision and unambiguity. Let us note that the use of this staff for the appraisal of the importance of inventions and their influence on the technical and economic parameters of objects of equipment and technology is impossible, since the purpose of patent examination is to record technical ideas and to establish their creative nature. At the stage of patent examination the inventions, which will become in the future the basis of new equipment, and the inventions, which will not be able to compete with those which already exist and have been assimilated by industry, are indistinguishable; a large portion of the inventions, which are registered by patent departments, are never used by industry.

The system of the appraisal of product quality can be a tool of the increase of the effectiveness of the system of the stimulation of inventions, since precisely the major inventions, which are used in an object of equipment or in a new processing method, are the most important prerequisite of the increase of the quality of a product and the assurance of its competitive ability.

Until recently the appraisal of an invention was to a significant extent the personal affair of the inventor and its connection with the national economic mechanism appeared only when patenting the invention abroad. The decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1984, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality," envisages a 1.5-fold increase of the markup on the wholesale price of new highly efficient products, as well as products, to which the State Emblem of Quality has been awarded, if the production of these products is based on developments which have been recognized in accordance with established procedure as discoveries and inventions. This provision of the decree linked the appraisal of major inventions with the national economic mechanism. The differentiation of inventions, their objective appraisal and a unified system of the stimulation of inventions and new equipment can be an effective means of managing technical policy in the sector. The authors proposed their own classification of inventions as especially important, major and insignificant [2].

For the adequate stimulation of major inventions it is advisable to pay the reward over a quite lengthy period of time--5-10 years, while for insignificant inventions to pay it once.

At present the period, over which an invention is appraised, is equal to 5 years. Major inventions far from always acquire during such a period of time an extensive scale of use, which creates the prerequisites for a disproportionately low reward. Minor improvements can become obsolete, but in a number of cases the appraisal of such inventions over 5 years can artificially lengthen the time of their use.



On the world license market an invention is valuable as long as it remains unsurpassed: precisely the monopoly or oligopoly, which is preserved for a long time, makes it possible to obtain significant assets from the use of an invention. Quite often not the sale of licenses, but the export of products at monopoly prices, which can be five- to sixfold higher than those which form on the terms of free competition, is advantageous [3]. The system of stimulation, which exists in our country, does not take into account the second version of the additional currency influx into the national economy. In the socialist countries the use of an invention abroad ensures a significant increase of the amount of the reward. In the CSSR, if a license for an invention is sold, the reward of the author amounts to up to 20 percent of the received license payments during the entire term of effect of the license agreement (but not more than 10 years). In Poland the maximum reward for the use of an invention in the country comes to 500,000 zloty; but if it makes it possible to expand exports or to eliminate imports, the reward can be increased to 1 million zloty.

The sale of a license for an invention, of course, is not irrefutable evidence of its value. Many original inventions find limited application in test runs of products and at pilot plants and subsequently are not used extensively in industry due to the lack of promise or the appearance of more valuable inventions. However, foreign firms purchase licenses for such inventions at a moderate price, therefore the formation of these inventions into a separate group is advisable, having specified for them the amount of the reward at the level of the maximum amount of the reward for insignificant inventions.

The use of an invention abroad by the sale of licenses or the export of products attests to the lack or shortage there of technical means of this sort, is conducive to freeing the national economy from imports and at the same time is confirmation of the fact that the expenditures on new equipment are being additionally recovered by its use abroad, while the time of the obsolescence of such new equipment is being postponed. The sources of the receipt of assets in this case are broadened, and, consequently, the increase of the maximum reward for such inventions is entirely justified.

It seems advisable to increase the maximum reward for especially important and major inventions. The line between especially important and major inventions should be drawn with allowance made for the degree of uniqueness and supremacy of the invention over a long period and with allowance made for the currency receipts from the use of the invention abroad.

The period, during which an invention can be recognized as especially important, could be established at 10 years, and for major inventions-- 5 years. It is advisable to make the appraisal of insignificant inventions in a noncentralized manner and once; here the exceeding of the maximum reward can be envisaged in several instances, for example, when the economic effectiveness, which is determined in accordance with the existing rules, comes to more than 1 million rubles.

A guaranteed minimum amount seems advisable for additional and associated inventions. Original inventions, which subsequently do not find extensive



industrial application, should be stimulated at the level of additional and associated inventions, on the basis of the amount of the currency receipts.

It is necessary to coordinate these proposals with the system of the reward for efficiency promotion and with the system of the stimulation of the development and introduction of new equipment.

In 1982 rewards of about 40 million rubles were paid for inventions, while rewards of more than 200 million rubles for paid for efficiency proposals. About 70,000 certificates of authorship for inventions are issued annually, while 26,000 were used in the same year of 1983. About 6 million applications for efficiency proposals are submitted annually, 4 million were recognized in 1983. At present the maximum reward for the use of an invention is 20,000 rubles, while the maximum reward for the use of an efficiency proposal is 5,000 rubles. Owing to the international agreements, to which the USSR is a party, it is possible to monopolize inventions in nearly all countries by obtaining patents. Precedents of the use of efficiency proposals abroad are practically unknown.

Any stiffening of the demands on the qualification of proposals at the local level is hard to achieve and will adversely affect the initiative of the broad masses of workers, but a change of the ratio of the existing maximum rewards and the modernization of the existing system of stimulation are entirely justified. This system suffers from the same shortcomings as the system of the stimulation of inventions. It is necessary to modernize this system with allowance made for the influence of efficiency promotion on the basic technological processes of the sector and the objects of license agreements.

The development of inventions is the result of individual creative work, while the development of processing methods on their basis, which involves risks and the overcoming of increased technical and economic difficulties, is a process which requires the efforts of collectives of scientific research institutes, design bureaus and the introducing enterprises. If as a result of such efforts an advanced processing method arises, it is necessary to establish incentive wage increments for specialists, who are the developers of the new processing method, as well as for production workers--engineers, foremen and workers.

The system of the stimulation of scientific and production collectives should be developed with the use of the experience of enterprises and organizations of the chemical industry in the differentiation of the deductions for material incentive funds subject to the level of developments on new equipment. The highest standards of deductions for incentive funds are used for the scientific research institutes, design and technological bureaus, scientific production associations and enterprises, which perform the work, whose results, which have been assimilated as objects of new equipment, surpass in the set of basic technical and economic indicators the best both domestic and foreign achievements. Fundamentally new processing methods, which do not have functional analogues in our country or abroad, the objects, which are included in the plan of the sale of licenses, as well as the objects, for which foreign patents have been obtained, conform to the highest level.

It is necessary to ensure the develop this procedure of the stimulation of collectives with allowance made for the specific nature of other sectors and to extend it to all sectors of industry. This will contribute to the increase of the export potential of our industry and to the raising of work quality in the national economy to the level of the long-range requirements.

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## AUTOMATION AND INFORMATION POLICY

### ORGANIZATION OF SCIENTIFIC, TECHNICAL INFORMATION SERVICES

Moscow LENINSKOYE ZNAMYA in Russian 14 Jul 84 p 2

[Article by O. Glazov, chief of the Division of Scientific and Technical Information and Invention of the Elektrostal'tyazhmash Production Association (Elektrostal): "Scientific and Technical Information: Versions Are Possible"]

[Text] There were times--and they have not yet been erased from memory--when they looked at staff members, who were engaged in the dissemination of scientific and technical information, as seekers of an easy life. Perhaps, because the specialist himself coped with the search for the printed innovations he needed, for there were not that many innovations. But if he wants to display such independence now, he, undoubtedly, would "drown" in heaps of periodicals. He cannot do without a middleman. The divisions of scientific and technical information, which have been set up at enterprises, have become such middlemen.

The Elektrostal'tyazhmash Production Association specializes in the output of equipment for the production of pipe and is the only enterprise, which designs, produces and supplies complete sets of equipment for pipe-welding machines and pipe-rolling plants. We develop ourselves--we embody ourselves the developments in metal. But, in order not to stew in our own juice, we should be in the know about all the latest achievements in the directions which interest us. The work of the Division of Scientific and Technical Information--information on the basic divisions of the enterprise--also begins with this. By means of a card file it is possible to find any literature on a topic of interest. But this direction is traditional, and we could not, of course, confine ourselves to it.

There are in any organization leading specialists (leading not according to staff position, but according to their role in the accomplishment of the main production tasks), who are in truth a brain center. How is one to help the "luminaries" in their work, so that they would not spend valuable time on auxiliary operations? We are introducing a system of selective-distributive information for the supply of leading specialists with the necessary periodicals. Having come to an agreement with them in advance on the theme which interests each one, we gather the necessary literature for a specific period, for example, for a year. The leading specialist does not rummage

around now in the card files: he merely submits an order, and we will it. In addition to planned information, we also issue, if required, rapid, so-called current awareness information. I foresee objections: Are these conditions not too elite? I agree, they are elite. But it is a question of those on whom the enterprise hangs!

Such concern about the "luminaries" does not at all mean that the other staff members of the association have been thrown to the mercy of fate and are not encompassed by our attention. All the themes of scientific research and experimental design work are supported by the appropriate literature. We are preparing retrospective surveys: what has been done on this theme in recent years, at what level it is necessary to aim. The bulk of the information prepared by us finds a place directly in developments: for example, in the last 57 scientific research jobs 726 information reports were used.

Moreover, the system of the information support of specialists, which exists at the association, is making information active, I would say aggressive. We do not wait until a developer drops in on us or the scientific and technical library. The staff members of the Division of Scientific and Technical Information themselves go to the specialists in the divisions and shops and to the innovators, where we organized mobile libraries. Without troubling himself with trips through the floors and corridors of the association, the specialist familiarizes himself with fresh periodicals at his workplace. If something has interested him, he makes an order on a form. If the indicated material is not in our holdings, we use the interlibrary loan system, but in any case we try to meet the request. The Division of Scientific and Technical Information--the developer--the Division of Scientific and Technical Information: such feedback is used in practice at our association. But the following figure confirms the fact that scientific and technical literature is arousing with the years greater and greater interest: during 1982 and 1983 12 percent more information reports were issued to staff members of the enterprise than during the same period of the last five-year plan. For 3 years in a row our association has held first place among the enterprises of the ministry in the competition on invention and the promotion of efficiency. And, I believe, our work played not the last role here.

At the association lectures on the achievements of science and technology and the holding of days of innovators, when we invite innovators from the Exhibition of National Economic Achievements to speak, have also become customary and already an integral part of the life of the collective. We show to engineers and production workers directly in the shops and divisions movies on the technical directions which interest them.

The plant radio is also not lagging: last year it took first place in the promotion of advanced know-how within the oblast review.

The introduction "from outside" of new decisions, which have already justified themselves in related sectors, is an important direction of the work of the association, in which a decisive role is assigned to our service. At any time we are obliged to answer the question: Is it worthwhile to engage in this development or is it possible to use the experience of colleagues? But who is "we"? The staff members of the Division of Scientific and Technical



Information? No matter how experienced we are, we could not settle such an important question on our own, in isolation. Support on the part of specialists: those who are interested most of all in obtaining information, is needed. And here I want to share the experience of our association.

An expert council, which considers the possibility and advisability of introducing scientific and technical achievements, which have been taken from information sources, has been set up here for efficient work on the use of domestic and foreign know-how. The chief engineer of the association is the chairman of the council, while the chief specialists, who are members of the council, head the 10 expert sections for the basic directions of the work of the association. There work within the sections 147 highly skilled experts and a control section, which checks the use of the measures which have been adopted for introduction.

In 1983 alone the experts "screened" 7,600 original sources, having selected from them 176 for possible introduction. Of them the council approved 39, they were included in the plan and are being introduced this year. For example, in accordance with the experience of the Sibelektrostal' Plant we introduced water-cooled crowns on two electric furnaces. As a result the output of the units increased and idle times were reduced. In all 600 tons of scarce fire brick were saved. But the main thing is that the forces and time of our specialists were saved: they did not have to "invent the bicycle." In all last year 177 innovations, which were borrowed from outside, with an economic impact in production proper of 473,000 rubles were introduced here.

When selecting promising ideas, which are proposed for introduction, we use the most rapid information--current awareness information. But great difficulties have arisen in recent years with the obtaining of current awareness information.

There is a paradox: frequently we are much better informed about foreign innovations than about domestic ones, which have been developed in related sectors. And do you know why? Previously information leaflets were issued both by territorial organs and by sectorial institutes. Having prepared some report or another, we duplicated it on our own and gave it life. Now, in accordance with a decree of the USSR State Committee for Science and Technology, the sectorial institutes have been deprived of such a right. We send the information leaflet to the Moscow Oblast Scientific and Technical Information Center, which according to the idea should print the leaflets in the necessary number. But they do not have enough forces! The printing house of the Moscow Oblast Scientific and Technical Information Center is "choking" in the flood of information, while meeting, for example, only half of our demands. And, apparently, not only ours.

But this is still not everything: they have prohibited us, just as, however, others as well, to subscribe to the information leaflets of the enterprises of other territorial organs. Due to this innovation we have lost day-to-day scientific and technical contacts with such regions as the Ukrainian SSR, Leningrad and Sverdlovsk, contacts which were always of appreciable benefit. The information leaflets of another region (only two or three copies each!) are sent to the Moscow Oblast Scientific and Technical Information Center,

where they are duplicated, but in an inadequate number. Here we found ourselves in a "vise": we are not able to send our own, output information to all addressees and we cannot always receive similar information.

And one problem still troubles me: Who is reinforcing the staffs of the divisions of scientific and technical information? The staff member of the division of scientific and technical information is half engineer and half librarian. But what is it in practice? The majority are graduates of pedagogical higher educational institutions. There is more than enough of a humanistic nature, but they almost do not understand technology. And even the certified graduates of an institute of culture, who have the specialty "scientific and technical information," have a very faint idea of technology. But now let us think about whom it is easier to train in work with technical information: the graduate in humanities, to whom it is necessary to explain the difference between a bolt and a nut, or the engineer, who has several humanistic inclinations? He enrolled at one time in a technical higher educational institution, graduated from it, but his heart is not directly in engineering activity. This is for whom there is a direct path to the division of scientific and technical information.

Technology is now developing rapidly. By using the most modern scientific ideas, specialists develop a large number of new types of machines, devices and technological processes. And the task of the division of scientific and technical information is not only to take note of this new thing in time and to inform all interested people about it, but also to be able to reorganize its work subject to the rapidly changing conditions in the world of science, technology and production.

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PATENTS AND INVENTIONS

PATENT INFORMATION SYSTEM

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 Sep 84 p 2

[Interview with Oleg Valerianovich Kedrovskiy, general director of the Poisk Scientific Production Association, by SOTSIALISTICHESKAYA INDUSTRIYA correspondent G. Sidorova: "The Patent Search"; date and place not given]

[Text] One of the important requirements of scientific and technical progress is the development of machines and technological processes at the level of the best world models. But in order to achieve this level, it is necessary to know what it is. Patent information helps to answer this question. More than 18 million descriptions of inventions are stored at the All-Union Patent and Technical Library (VPTB) alone.

A new All-Union State Standard--"The Procedure of Conducting Patent Research"--was put into effect in the country as of 1 January of this year. SOTSIALISTICHESKAYA INDUSTRIYA has already reported on this. But how ready were the patent services themselves for such work? Is the role of the state patent information system increasing? Our correspondent G. Sidorova talks about this with O. Kedrovskiy, general director of the Poisk Scientific Production Association.

[Question] Oleg Valerianovich, could you remind the readers why such a standard is needed?

[Answer] I will cite an example. At the Odessa Special Design Bureau of Precision Boring and Radial Drilling Machines they developed a drill-layout machine with numerical control and the automatic change of tools. Thus, the "innovation" is many times inferior to the foreign analogue in the time of the change of tools and half as good in the precision of positioning and the speed of the moving of the spindle. One would like to know who needs such equipment? This happened because before the start of the work the designers did not conduct patent research. They were not interested in what had already been done in this area in our country and abroad. But today this is the basic stage of any development.

Unfortunately, the established procedure of planning and performing scientific research and experimental design work does not make strict demands in the conducting of a preliminary patent search. The results of the analysis of the check appraisal of the patentability and patent cleanness of the equipment being developed also confirm this. The new standard is aimed at eliminating such a situation. It will help to avoid the most flagrant mistakes in designing.

[Question] What is being done for the supply of all the subdivisions of the national economy with patent information?

[Answer] A centralized system of the processing and dissemination of information on domestic and foreign inventions is in operation in the USSR State Committee for Inventions and Discoveries. A state patent information system has been formed. In addition to the all-union information centers--the Poisk Scientific Production Association and the All-Union Patent and Technical Library--108 territorial and republic organs, more than 1,200 main scientific research institutes of the sectors of the national economy and more than 5,000 enterprises and organizations, which make up their own holdings, belong to the system. But the accumulation of large holdings is not an end in itself. The main thing is that the documents would become available to specialists rapidly and in the necessary amount. In recent years orders have begun to arrive more infrequently at the All-Union Patent and Technical Library from several regions of the country. This means that the patent experts and specialists locally are finding everything that interests them. Unfortunately, matters are that way not everywhere. The problem is that the usual holdings are made up only by information on domestic inventions. It is necessary to turn to one of the base centers for descriptions of foreign innovations. The orders here take a long time to be filled, and at times are not filled at all. There is not enough copying and duplicating equipment. The assignments on its development and production are being upset. I believe that this question merits serious attention of the USSR State Committee for Science and Technology and the USSR State Planning Committee.

We have now formulated new methods of making up and using sectorial and territorial holdings, which make it possible to provide them with the necessary amount of foreign information. About 1 million reports on inventions appear annually in the world. It is impossible to process and transmit such an amount of information without computer technology. The All-Union Magnetic Tape Service of Patent Information has been operating for several years now. A magnetic tape with a recording of information on inventions from 50 countries of the world and 2 international organizations is received regularly at the Poisk Scientific Production Association. We send copies of the tape to 67 information and scientific centers, while they supply more than 4,000 enterprises and organizations with the received information. The gain in time for developers as compared with traditional methods of the dissemination of information is 4-5 months.

However, if we judge the activity of the state patent information system from the end results--the indicators of invention, it should be admitted that there is still much to do. About half of the received applications for inventions are not such--similar approaches already exist, their descriptions are



available in the patent holdings. So reserves for the improvement of the system exist. One of the most serious causes of the appearance of pseudo-new equipment is the poor development of the patent information services at enterprises and scientific research institutes. But without this it is impossible to establish regular contact with the network of information centers which operate in the country.

[Question] That is, at enterprises there should be professional information workers and specialist-patent experts?

[Answer] Yes. Those who believe that the developers themselves can analyze and evaluate the arriving information, are mistaken. The specialist is better informed about the latest achievements in some specific field. He will help to evaluate the technical level and to determine the choice of a promising direction. Unfortunately, they still do not understand everywhere the importance and necessity of such subdivisions. With the assistance of the USSR Central Statistical Administration we took a census of them. It turned out that at a large number of scientific research institutes and design bureaus there are simply no patent information services. At some they number one person. An abnormal situation has formed: in the country personnel are being trained, the All-Union State Standard has gone into effect, but the fate of the patent information services and patent subdivisions as a whole as before depends on the subjective attitude toward them of the managers of enterprises and organizations. This is not being coordinated with the requirements of the acceleration of the pace of scientific and technical progress. The position of patent services should be determined by the corresponding status. Then our most abundant holdings will actually help specialists to develop equipment which is directed toward the future.

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8 May 1985

## GENERAL

## ACADEMICIAN OVCHINNIKOV ON FUTURE OF BIOORGANIC CHEMISTRY

Moscow IZVESTIYA in Russian 4 Jan 85 p 3

[Interview with Vice President of the USSR Academy of Sciences Academician Yuriy Anatol'yevich Ovchinnikov by IZVESTIYA special correspondents Ye. Manchurova and M. Khromchenko: "Boldness of Thinking Is Needed"; date and place not specified]

[Text] We are entering a celebration! Children, snatches of poetry and songs, the calling of joyful voices, bright spots of color and light, music. In the spacious vestibule of the institute there is a New Year's tree. The New Year's spirit is also spreading, it seems, to the fifth floor, to the businesslike silence of the director's office. And is reflected by anticipation, by expectation, which it is impossible to deceive. We came here to talk about the future which science foresees and is bringing closer, about the people who will work in the next century.

[Question] Yuriy Anatol'yevich, the space of your scientific center has now been given to children. Not all of them will become scientists--chemists, biologists, physicists. But someone will. Is it possible to specify what most important and interesting problem those, who come to science in 10-15 years, will have to solve?

[Answer] Yes. And regardless of which one they choose, they will have to work at the most difficult crossroads of problems: the secret of man should be revealed. Today we are still at the very distant approaches to it. But its keen urgency is realized by everyone who works in science.

Every scientist would tell in his own way about his own movement toward this secret. There are the positions of the sociologist and economist, the medical man and psychologist. The representatives of modern physical chemical biology have another point of view: having mastered the methods of work with microorganism, they have shifted to research on plants and animals. I will speak from the position of a bioorganic chemist. Recently at our institute a previously unknown substance was isolated from brain tissue. It is extremely active. A microscopic dose is sufficient for both an individual cell and the

body to change behavior drastically. They become extremely active--even having become weak, they continue to advance.

The new substance is from the class of peptides. In other words, its molecule is built from a large number of "little bricks"--amino acids. In proteins there are tens of them, in neuropeptides, which are being isolated and work in the brain, there are only a few. But the role of these squabs is great. They facilitate remembering and bring about sleep. Our peptide also belongs to such a class of information transmitters.

We are experimenting with it. We are adding to the molecule and are shortening it. Then we see how such changes affect its working. We now know that our molecule, which has been shortened by one "little brick," also changes both the cell and the body of an animal. But in a completely different way. Instead of activeness there is morbidity. For the present I cannot yet determine what changes in the brain. Not without reason do they compare it with the ocean: we see the surface swells, but do not know what is in the depths.

Both physiologists and psychologists deal with the whole brain. The nuances of behavior, which are observed by them, in combination with checking by psychological tests and encephalograms provide much, but still do not make it possible to understand: What happens in brain cells? But there is there the foundation, in which physical chemical rearrangements take place. For example, it is definitely known: in the neurons the concentration of some substances or others changed, this immediately affected the "surface"--behavior. But another time it did not!

Everything seems unstable, elusive. The body constantly synthesizes the substances which we are trying to determine, analyze and synthesize--to understand in accordance with what signal they go to work.

[Question] Unstably. But all the same are you seeking the biochemical code of behavior?

[Answer] They are seeking it throughout the world. This is necessary in order to help man. Although it is difficult. This is much more unknown and unexpected in man than what is guaranteed. When this was realized by world science, the unreliability of many studies was revealed. They became "slag."

[Question] We understand that all research is conducted for the sake of man. But how is one to compare with him the results of experiments on animals?

[Answer] But we do not do this. Animals are no more than a simplified model. The human brain is the most complicated thing which exists in nature. We are seeking approaches to it, studying its individual cells--neurons, and the molecular changes in them. But here, too, we are faced with unbelievable difficulties. The neuron is a complicated unknown world. The methods, which were developed for one-cell organisms like E. coli or yeast, are unsuitable for its study. They are all alike, all "like two peas in a pod." Neurons are a different matter. They determine the belonging not only to some species or

other of animals. They determine the uniqueness of the individual! What we have found out about one neuron is not at all always applicable to others.

[Question] Yuriy Anatol'yevich, apparently, the picture with chemical signals of the brain is the same as with electrical signals? For example, the electric waves, which are recorded on the encephalogram of a calmly awake person, are uniquely individual. This is a physiological passport, like finger prints. The alpha rhythms even of identical twins do not coincide. How is one to study an organism, in which individuality is interwoven into the common laws of what is living?

[Answer] Of course, the solution lies in comprehensive research. And this makes very important new demands on personnel. "Now, when the need has arisen for profound qualitative changes in all spheres of society, the problem of personnel has acquired a special ring," General Secretary of the CPSU Central Committee K. U. Chernenko stressed. This thesis fully applies to the personnel of the science which studies what is living.

Narrow specialists, traditionally advancing into the unknown via "their own grooves," as a rule, come to dead ends. Whereas it was possible to bypass them when studying individual, comparatively simple organs, in the approach to the brain a narrow professional view will become an insurmountable obstacle. The cultivation of new thinking is necessary for the solution of future problems.

[Question] This will require considerable efforts and time, because now, if we have understood correctly, you have described a critical situation. The subdivision of the sciences leads to the narrowing of the world outlook of scientists, to the monotony of labor. But this was never appealing. Is the decline of the prestige of the occupation not connected with the threatening monotony of daily activity (no longer of the scholar-scientist)? And this is in the age of the scientific and technical revolution! At any rate, young people are not dying to get into science with the same fervor as about 20 years ago. For example, at Moscow State University, where you head a chair, the competition has been declining from year to year.

[Answer] Do you want to contrast the enthusiasm for the occupation and the romanticism of research with monotony? But the daily life of a mountaineer or polar explorer is much more romantic--when viewed from outside, however! But question anyone, what does he do when climbing a mountain or conquering the road to the pole? He moves step by step, fits out a site for a tent, prepares food, sleeps, then again meter by meter. And the closer the goal is, the more difficult each step is. The longest meter, mountaineers say, lies before the summit.

Not everyone is capable of such a thing. But the most talented and active people have always chosen the most difficult thing for themselves. And genuine science is made not by the quantity, but the quality of people. The competition is declining? This does not worry me. Moreover, it is not everywhere. At the Biology Faculty of Moscow State University, since you have mentioned it, 8-10 candidates for admission vie for 1 spot. What attracts



them? In my opinion, the most interesting thing that there is and is approaching is science--the comprehension of life, the understanding of man.

Yes, I have occasion to run across people who, having achieved some results and a position, leave it at that, cool down, lose interest and obsession. There are various reasons for that. But be as it may, our ways are not the ways of those who have cooled down, who do not need anything more.

We have solved in recent years and are solving today difficult practical problems. The first genetic engineering interferon has been turned over to medical people for clinical tests, the second and third are on the approach. The technology of obtaining genetic engineering insulin is being developed. In accordance with an understanding with the USSR Ministry of Health we have set to work on obtaining a vaccine against hepatitis. Millions of ill people in our country and throughout the world are interested in each of these preparations. Is the task suitable for scientists, be it the manager of a collective, the rank and file performer or the young specialist? I am convinced: it is more than suitable. And the most pleasant thing for me (which, incidentally, refutes your reproach with the monotony of labor and the lack of romanticism) is: chemists, like physicians, first test on themselves newly developed preparations--such was the case in our country with interferon. The young do not halt before coming into direct "contact" with a virus dangerous to the health and are seeking this opportunity now, when we are developing the new vaccine. I am convinced: the eternal romanticism of dangerous research and the sense of responsibility attract them.

[Question] Your attitude toward pioneering research is understandable. But the scientist has not only such a task. It is still necessary also to introduce. How quickly does that has been discovered and produced with such difficulty enter life?

[Question] It depends on how the next stage is organized. For example, interferon was introduced quickly, without delays: our allies--the Main Administration of the Microbiological Industry, one of the youngest industrial sectors--began the stage of introduction. The management understood that it is impossible to achieve fundamentally new results, say, to obtain effective preparations, in which medicine and agriculture are interested, on the basis of the old principles of the organization of production and traditional technologies. Therefore, people, who had passed through the school of basic science and had experienced on themselves all the obstacles of introduction, were selected for the key sections. For them the development of the plant technology was from the start creative work. It was not we who ran after them, begging "take it, introduce it," but they who breathed down our neck and pressed for an answer: "When will you finish your manipulations and turn the microbe culture over to us?!"

And there is a result. A month (!) after the completion of the work of the laboratories of three academic institutes the pilot production of interferon was started. At a plant! Without pressure on our part.

The practical workers had a material stimulus. According to the results of introduction everyone involved in it was paid a bonus. So it should be. But

the success was decided not only by economic stimuli, but by the fact that at all the stages--from the institute test tube to the plant fermenter--there were like-minded people.

[Question] Well it is simply an idyll! And is everything at your place exactly the same with other preparations? Hence, are the interests of the academic institute with its pioneering developments and the interests of the sector, which due to innovations can endanger the fulfillment of the plan, not only not antagonistic, but also completely coincide?

[Answer] If only it were so. In daily practice we have to take into consideration that any sector inevitably has its own interests. Therefore at some one of the last stages the sectorial institute strives to create the impression that everything, from start to finish, was done only in its subdivisions. Obviously, this is due to the existing system of stimulation: if the technology of obtaining a new preparation was developed by the sector itself, the more honor for it.

In order not to become dependent on sectors and to speed up the advance of new developments into practice, we have been forced to set up at the academy pilot works. At our center there are both small and large-tonnage fermenters. We can produce the same amount of output as a small plant. The preparations are quite active, large quantities of them are required for a course of treatment or for the achievement of a result in agriculture. For example, previously kilograms of pesticides were required for the treatment of a hectare of plantings--10-20 g of the new ones are sufficient. I do not believe that such an improvement of a preparation is advantageous to the sector for the fulfillment of the plan in tons, but it is needed by the national economy, is important for the fulfillment of the Food Program and is governed by the interests of man. And therefore I am convinced that at the forthcoming CPSU Central Committee Plenum much attention will be devoted both to the problems of the organization of biological science and to the questions of the introduction of its achievements in practice.

[Question] Thus, the orientation toward practice and at the same time the audacity of thought for the assault on the innermost of secrets of nature--the discovery of the biological essence of man. Very different qualities belong to the new thinking.

[Answer] There is no alternative here. There no longer is. In the past, indeed, it seemed that these were different qualities of thinking. Modern life requires both.

When I came to the institute, it was believed that we did not need pilot works: there were no genetic engineering, biotechnologies and much more. Molecular biology, which spouted a flow of discoveries, had emerged in the forefront, but it was still a long way to practice. And practical people looked askance at such biology.

The times have changed and we with them. Today I see what physical chemical biology can give to practice, to man. And no other science will give this. Hence, I should also do what I should. Hence the work on interferon and other

preparations for medicine, on new pesticides and other effective compounds for agriculture. Hence the aspiration to seek more effective levers of introduction, "subtle" contacts with the Main Administration of the Microbiological Industry and other departments.

But practical science and practicality are fundamentally different things. Science is not the patching of holes. I have already said: the knowledge of man has become urgent for world science. It is impossible without the solution of fundamental problems. Problems so complicated that the work on them naturally unites scientists of the entire world. Mankind has developed especially effectively during those periods when together it "turned over" world experience.

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CSO: 1814/82

GENERAL

TECHNICAL LITERATURE PUBLISHING PLANS FOR 1985

Moscow KNIZHNOYE OBOZRENIYE in Russian No 1, 4 Jan 85 p 6

[Article by V. Yezhkov, member of the Collegium of the USSR State Committee for Publishing Houses, Printing Plants and the Book Trade and chief editor of the Main Editorial Staff for Scientific and Technical Literature: "New Gains"]

[Text] Our country has entered the final year of the 11th Five-Year Plan. The 26th CPSU Congress, the subsequent CPSU Central Committee plenums and the decrees of the party and government specified the main means of achieving new gains of socioeconomic progress. These are the rapid development of social production and the changeover to the path of intensification, which can be achieved only on the basis of scientific and technical progress, the decisive increase of labor productivity and the improvement of work quality. The tightening up of the policy of economy and the improvement of management and the economic mechanism are not less important.

In a report at the June (1983) CPSU Central Committee Plenum Comrade K. U. Chernenko especially noted: "Today the party and the people are accomplishing tasks of an unprecedented scale. We are implementing the largest comprehensive socioeconomic programs, including the Food and Energy Programs, are striving for the intensification of production and the acceleration of scientific and technical progress and are changing the face of immense regions. We are persistently struggling so that the colossal possibilities of our economy, science and culture and our natural resources would be used as completely and efficiently as possible."

The utmost development of the agroindustrial complex and its main unit--agriculture--and the consistent implementation of the USSR Food Program are contributing to the further strengthening of the economic potential of the country. The long-term reclamation program, which was adopted at the October (1984) CPSU Central Committee Plenum, will contribute to the significant increase of the fertility of lands.

The Food Program found reflection in the literature of practically all publishing houses. Serious attention is being devoted to the promotion and implementation of the agrarian policy of the party and to the most important questions of the development of the agroindustrial complex. A number of



inter-publishing house series are being published by the central scientific and technical publishing houses: "Questions of Agroindustrial Integration," "Industry to the Countryside" and others. The publication of the series: "For Economy and Thrift," "For Efficiency and Quality," "Advanced Technology for All Kolkhozes and Sovkhozes," "Animal Husbandry Is a Shock Front," of the libraries of the stock breeder, the plant grower, the machine operator and others will be continued.

For the comprehensive, more thorough coverage of questions of the development of the agroindustrial complex the All-Union Agropromizdat Association has been set up on the basis of the Kolos Publishing House. The publication of scientific and production, educational methods and educational literature for workers of the sectors of the agroindustrial complex, posters, as well as mass literature for people, who are busy with the private plot, collective horticulture and gardening, and journals, which cover the problems of the agroindustrial complex, has been assigned to Agropromizdat. The publication of books and pamphlets on advanced know-how and other urgent questions as library-supplements to the corresponding journals is also envisaged.

The implementation of the USSR Energy Program in conformity with the decisions of the 26th CPSU Congress is one of the necessary conditions for the acceleration of the changeover of the economy of the country to the intensive means of development, will make it possible to increase substantially the power-worker ratio of the sectors of the national economy and will contribute to the successful fulfillment of the USSR Food Program.

The general problems of the development of power engineering and the utmost saving of fuel and electric power will find reflection in the books which are being published by the scientific and technical publishing houses in 1985: V. Neporozhniy, editor, "Tekhnicheskii progress energetiki SSSR" [Technical Progress of USSR Power Engineering], V. Belousov, Yu. Kopytov, "Puti ekonomii energoresursov" [Means of Saving Energy Resources] (Energoatomizdat), S. Yatrov et al., "Energeticheskii balans SSSR" [The USSR Energy Balance] ("Nedra"), A. Dmitriyevskiy, Ye. Shatrov, "Toplivnaya ekonomichnost' benzinovykh dvigateley" [The Fuel Efficiency of Gasoline Engines] ("Mashinostroyeniye") and others.

It is necessary to indicate the books which are included in the inter-publishing house series "The Saving of Fuel and Electric Power." This series was organized in 1981. Now nearly 40 books and pamphlets have been published, it is planned to publish just as many in 1985. The books of the series cover the organization of the work on the saving of fuel and electric power in various sectors of the national economy: P. Aleksandrov et al., "Ratsional'noye ispol'zovaniye i ekonomiya energoresursov v derevoobrabatyvayushchey promyshlennosti" [The Efficient Use and Saving of Energy Resources in the Wood Processing Industry] ("Lesnaya promyshlennost"), I. Svyatets, "Tekhnologicheskoye ispol'zovaniye burykh ugley" [The Technological Use of Lignites] ("Nedra"), Ye. Karti, "Energosberezheniye v sistemakh konditsionirovaniya vozdukh" [Energy Saving in Air Conditioning Systems], (Stroyizdat), P. Yegunov, editor, "Sovershenstvovaniye teplovozykh dvigateley i okhladayushchikh ustroystv" [The Improvement of Diesel Locomotive Engines and Cooling Systems] ("Transport"), V. Volyanskiy, "Ratsional'noye

ispol'zovaniye elektroenergii v mekhanizmax i apparatakh khimicheskikh proizvodstv" [The Efficient Use of Electric Power in Devices and Apparatus of Chemical Works] ("Khimiya").

The intensive development of nuclear power for the generation of electric power and thermal energy is one of the basic provisions of the USSR Energy Program. A number of books on these problems will be published in 1985 by Energoatomizdat: S. Luk'yanov et al., "Diagnostika termoyadernoy plazmy" [The Diagnosis of Thermonuclear Plasma], R. Tom, D. Tarr, "Magnitnyye sistemy dlya MGD i termoyadernykh ustanovok" [Magnetic Systems for Magnetohydrodynamic and Thermonuclear Plants], A. Madoyan, V. Kantsedalov, "Distanttsionnyy kontrol' oborudovaniya TES i AES" [The Remote Control of the Equipment of Thermal and Nuclear Electric Power Plants], V. Karpov, "Toplivnyye tsikly i fizicheskiye osobennosti vysokotemperaturnykh reaktorov" [The Fuel Cycles and Physical Features of High Temperature Reactors], N. Mel'nikov, "Konstruktivnyye formy i metody rascheta yadernykh reaktorov" [The Structural Forms and Methods of Rating Thermonuclear Reactors], I. Malashkin, A. Pereguda, "Raschet i optimizatsiya nadezhnosti sistemy avariynoy zashchity yadernykh reaktorov" [The Rating and the Optimization of the Reliability of the Safety System of Nuclear Reactors], Ye. Glushkov et al., "Teplovydeleniye v yadernom reaktore" [Heat Release in a Nuclear Reactor], Yu. Chechetkin et al., "Ochistka radioaktivnykh gazoobraznykh otkhodov AES" [The Decontamination of the Radioactive Gaseous Waste Products of Nuclear Electric Power Plants], B. Kalin et al., "Problemy vybora materialov dlya termoyadernykh reaktorov. Radiatsionnaya eroziya" [Problems of the Choice of Materials for Thermonuclear Reactors. Radiation Erosion] and others. Books on the problems of the creation of the technical and material base for the extensive introduction of fast reactors, secondary nuclear fuel, the energy of thermonuclear fusion, as well as nontraditional renewable energy sources will be published.

Plans of the publication of literature on such urgent problems of scientific and technical progress as the practical use in various sectors of industry and agriculture of modern discoveries in the area of science and technology and the overall automation of production on the basis of the use of computer technology, microprocessors and robotic systems have been outlined and are being implemented ("Primeneniye promyshlennykh robotov" [The Use of Industrial Robots], "Mikroprotsessornyye sistemy chislovogo programmnoy upravleniya stankami" [Microprocessor Systems of the Numerical Program Control of Machine Tools], "Prikladnaya lazernaya optika" [Applied Laser Optics], "Tekhnologicheskkiye osnovy gibkikh avtomatizirovannykh proizvodstv" [The Technological Bases of Versatile Automated Production Systems], "Planirovaniye gibkikh proizvodstvennykh sistem" [The Planning of Versatile Production Systems]).

Sectorial handbooks, to the publication of which preferred attention is being devoted, are providing considerable assistance to specialists of the national economy. The central scientific and technical publishing houses alone will publish during the years of the 11th Five-Year Plan about 1,500 names of handbooks for various categories of specialists of the national economy, including 300 names in 1985. Great importance is being attached to the publication of educational and production literature.

The publication of both individual books and small libraries on the promotion of advanced know-how and the increase of the occupational knowledge of workers, for example, the inter-publishing house series and libraries: "The Economic Life of the Country," "Heroes of Labor," "Leading Collectives," has been organized at practically every publishing house.

The ever increasing role of the brigade form of the organization and stimulation of labor in the further intensification of social production, the increase of labor productivity and the decrease of the losses of working time and of the economical and efficient use of material and manpower resources is covered in the inter-publishing house series "Steps of the Brigade Contract." The books: "Uspekhi reshayet brigada" [The Brigade Determines Success] ("Metallurgiya"), "Desyat' let na brigadnom podryade" [10 Years on the Brigade Contract] (Stroyizdat), "Brigadnyy podryad v elektromontazhnom proizvodstve" [The Brigade Contract in Wiring Work] (Energoatomizdat) and others, will be included in this series.

The inter-publishing house series of books "Labor Productivity Is the Main Thing, the Most Important Thing" is devoted to questions of the fundamental increase of labor productivity, to the advantages of collective forms of the organization of labor, to the efficient use of all types of resources, to the development of democratic principles in the management of production and to the tightening up of discipline and organization. In 1985 readers will be able to acquaint themselves with the following books of this series: "Mekhanizatsiya i avtomatizatsiya stantsionnykh protsessov" [The Mechanization and Automation of Station Processes] ("Transport"), "Proizvoditel'nost' truda i zarabotnaya plata v stroitel'stve sooruzheniy svyazi" [Labor Productivity and Wages in the Construction of Communications Facilities] ("Radio i svyaz"), "Ekonomicheskiye problemy povysheniya proizvoditel'nosti truda v stroitel'stve" [Economic Problems of the Increase of Labor Productivity in Construction] (Stroyizdat), "Sokrashcheniye primeneniya ruchnogo truda v sudostroyenii" [The Decrease of the Use of Manual Labor in Shipbuilding] ("Sudostroyeniye").

The work experience of production associations and enterprises of industry, the conditions and progress of the large-scale experiment, which is being conducted in a number of sectors of the national economy, are being promoted in the books of the inter-publishing house series "Enterprises--Independence and Responsibility." In 1985 in connection with the further extension of the economic experiment and the involvement in it of a number of other ministries the themes of the publications of this series will be supplemented. Such books as "V poiske--ves' kollektiv" [The Entire Collective Is in the Search] (on the work experience of the Minsk Worsted Combine), "Eksperiment v mestnoy promyshlennosti Litovskoy SSR" [The Experiment in Local Industry of the Lithuanian SSR] and so on will be published.

Constant attention is being devoted to the publication of translated and joint publications with authors of the socialist and capitalist countries. During the period from 1975 to 1984 the publication of translated scientific and technical literature in our country increased by more than twofold. At present the central scientific and technical publishing houses alone annually publish more than 500 translated books on urgent problems of scientific and

technical progress. The publication of joint publications also increased. Such a form of cooperation as the publication of international series is finding greater and greater prevalence. As an example it is possible to cite the organization jointly with the fraternal countries of an international series on energy problems (the saving and efficient use of fuel and energy resources, the forecasting and planning of the development of power engineering of the CEMA member countries, international cooperation in the area of nuclear energy and so on). In these directions at present publishing houses of the USSR (Energoatomizdat, "Khimiya") and the socialist countries are selecting collectives of authors, are coordinating the long-term plans of publications and are coordinating the dates of their publication.

The decree of the April (1984) CPSU Central Committee Plenum "On the Basic Directions of the Reform of the General Educational and Vocational School" commenced a new stage in the further development of the school, the increase of its role in the communist education of the rising generation and the formation of a harmoniously developed individual. A decision was made on the publication of the inter-publishing house mass series "The Popular Science Library of the School Child." In the books of this series it is planned to tell in popular terms about modern discoveries in the area of science and technology.

In May 1985 our country will celebrate the 40th anniversary of the Victory of the Soviet people in the Great Patriotic War of 1941-1945. On the occasion of this date the central scientific and technical publishing houses will publish a number of books: V. Fedorchuk, "Geologi--frontu" [Geologists to the Front] ("Nedra"), I. Aleksanyan, M. Knopov, "Glavnyye khirurgi fronta" [The Main Surgeons of the Front] ("Meditsina"), A. Zaytsev, "Memorial'nyye ansambli v gorodakh-geroyakh" [Memorial Ensembles in the Hero Cities] (Stroyizdat), Yu. Malov, V. Malov, "Letopis' Velikoy Otechestvennoy voyny v filatelii" [The Chronicle of the Great Patriotic War in Philately] ("Radio i svyaz").

A number of books are devoted to the 50th anniversary of the Stakhanovite movement, socialist competition and outstanding representatives of the working class and the kolkhoz peasantry ("Dorozhniki na stakhanovskoy vakhte" [Highway Workers on the Stakhanovite Watch], "Transport"; "Estafeta lesnykh pyatiletok" [Relay Race of the Timber Five-Year Plans], "Lesnaya promyshlennost"; "Stakhanovskiye traditsii" [Stakhanovite Traditions], "Nedra", and others).

Many books of the scientific and technical publishing houses are devoted to concern for the health of man and environmental protection.

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GENERAL

GENERAL LAWS OF DEVELOPMENT OF TECHNOLOGY

Tallinn SOVETSKAYA ESTONIYA in Russian 2 Nov 84 p 2

[Article by Candidate of Technical Sciences T. Lekhtla: "The World of Technology Is the World of People"]

[Text] The world of technology. In our times it is interwoven with the world of things, which surrounds us. Technology in its essence is becoming more and more incomprehensible and complex, but, on the other hand, also more intelligible, ubiquitous and intrusive. We often hear about the space age, the chemical, energy or information age, the words ultrasuper, micro and so forth have become firmly established in our speech. We often curse machines for the imperfection of design or for their inadequate reliability, but at the same time cannot live without them. We admire the achievements of technology, but consider it to blame for the pollution of the environment or for the nervousness and haste in human relations. Technology helps us to work, to travel and to have a good time, but takes time from us, makes us take care of it and forces us to act in accordance with its laws. For every technical device has its own operating manual. And how much special knowledge it requires of us! Will the penetration of technology into the most different spheres of the life of man continue in the future? Will there not come a time when we will be forced to spend a large portion of our knowledge and time on the assurance of the serviceability of machines? Today technology is asking us many questions, and it is not that easy to answer them. But, perhaps, there exist some general laws of the development of technology, which help us to understand more thoroughly the processes taking place?

At different times people treated technology and machines differently. Of course, the machines were also different at one time. Medieval skilled craftsmen competed in the elegance and subtlety of the designs of the machines developed by them. Years, and at times tens of years, were spent on some machine or device. The creative work of many ancient skilled craftsmen also adorns our museums today.

The industrial revolution in the late 18th century in Great Britain, which continued for more than 100 years, marked the beginning of the rapid development of technology. The changeover to industrial technology, that is, to the mechanized production of machines, was its result. The rapid increase of the power-worker ratio, which was connected with the invention of the steam engine, was the basis of the revolution. Since then the power parameters of machines have become their main characteristics. More and more heavy-duty, quick and powerful machines were developed. A large number of new energy converters were invented. It is even possible to say that technology stepped from one mechanized era to another--the power era. The steel skeletons of machines acquired powerful artificial--electric--muscles.

But in the beginning machines were not noted for "intelligence." A person, who actually became a part of one machine or another, had to control them. While there were few machines, this role, even though not very envious, suited man. The obedience and power of the machines instilled self-confidence in him. Unfortunately, often excessive self-confidence.

However, gradually it began to become clear that in some cases machines themselves can control machines. The time of automatic machines arrived. Today we are witnesses to the scientific and technical revolution. In a historically short period the world of technology has changed beyond recognition. New inventions are following one after the other so often that at times they are not even noticed. In recent years people have begun to speak and write more and more about microprocessors, industrial robots, NC machine tools, machining centers, the versatile automated production system (GAP) and so on. All these devices, machines and systems are the "first harbingers" of the new era of "intelligent" machines. Electronic brains have been added to the steel skeletons and electric muscles of machines.

The creation of "thinking" machines is a result of the rapid development of computer technology and the formation of the foundations of the new science of cybernetics. What has happened in electronics, automation and computer technology in the past 30, 20 or even only 10 years is so striking that the authors of many popular science articles cite the most unexpected comparisons. For example, in the journal V MIRE NAUKI (No 8, 1983) in an article on personal computers it is written: "If in the past 25 years the aircraft industry had developed as rapidly as computer technology, it would be possible to buy a Boeing-767 today for \$500 and to circle the world in it in 20 minutes, while consuming in so doing 19 liters of fuel." From this analogy, although not an entire correct one, it is possible to judge the rate of decrease of the cost and power consumption, as well as the increase of the speed of computers. Today's level of computer technology is specifically embodied in microprocessors and in the devices which have been developed on their basis. Tens of thousands of transistors, which are connected not somehow, but precisely according to a circuit diagram, are positioned on tiny silicon chips which measure only several tens of square millimeters. Microprocessors, memories and others are produced this way. It is hard to believe that this processor performs millions of arithmetic operations a second, while it is possible to enter hundreds of pages of text into such a memory.

Electronics and computer technology have created such a powerful technical base that in the immediate future it is possible to expect their penetration into all spheres of the activity of man. There is no longer doubt that it is possible to teach a computer to speak any language, to read both printed and hand-written texts and to gradually recognize any objects which can be seen and even cannot be seen by man. Fifth-generation computers, which are capable of conducting a dialogue with us and of formulating independently programs for the solution of a posed problem, are already being designed.

Industrial robots and NC machine tools are representatives of a new generation of machines, which have vast physical, functional and intellectual capabilities. "Intelligence" and multifunctionality are also the main attributes which distinguish them from traditional machines. Robots position and remove blanks on metal-removal machine tools, perform precision and arc welding and work in the place of man in the danger zone of the operation of forging and stamping presses. They are also used in painting and the application of coatings with chemically active substances and flammable dyes. That is, rough, dangerous or unappealing work is intended first of all for robots.

The peculiarity of new "intelligent" machines is, as was already said, the fact that it is possible to teach them--to enter in their memory programs which ensure their control. Moreover, computers with more developed "intelligence" take upon themselves the creation of simple programs. The first steps have already been taken in this direction.

The modern world is awaiting the appearance of "thinking" machines. First, the power parameters of machines have increased so much that man is no longer physically capable of controlling powerful, quick and complex machines. Second, the energy, ecological and other crises require of technology qualitatively greater capabilities--such as, for example, the increase of efficiency and the decrease of waste products. Only "intelligent" machines with microprocessor control can ensure this. Third, the number of different machines has increased so much that there are not enough people to control them.

In recent years the term "unmanned technology" has been used more and more often, especially when discussing the problems of the overall automation of industrial production, since experience in the setting up of automated shops and automated plants already exists. Although narrowly specialized automatic flow lines still retain their place, important changes have already occurred in the development of technology: in the future versatile automated production systems will become its basis.

In contrast to "rigid" automatic lines, it is easy to readjust them for the output of new products. This is done by changing the control programs of the NC machine tools, industrial robots, control computers and other machines.

Social necessity also led to the appearance of the versatile automated production system. In recent times mass production has begun to yield its place to series or small-series production, while mass consumption is being replaced more and more by individual consumption. This requires frequent

changes in the processing method, for which "rigid" production systems are unsuitable. The broadening of the range of items being produced and the shortening of the time of the introduction of new products also testify in favor of the versatile automated production system.

The above-examined trends of the development of technology follow from the general laws of dialectics. For example, competition between opposites--such as multifunctionality and specialization, integration and differentiation, rigidity and flexibility--is the source of the improvement of technical systems. Those systems, whose functional possibilities increase more rapidly than their complexity, are the most efficient and viable.

The development of technical systems proceeds in a spiral. The shift to a new turn corresponds to a leap in the technology of the development of the system or in its component base. The shifts to the mechanized production of machines and to the mechanized control of machines were important leaps in the history of technology. There were many small leaps in various areas of technology. It is possible to regard as such the alternation of individual generations of computers, which corresponds to the shifts from the use of vacuum tubes to transistors and further to the use of integrated microcircuits and microprocessors.

The understanding of the essence of what is happening helps us to make long-range decisions and to identify the made mistakes in time. In the recent decisions of the CPSU Central Committee the question of the universal increase of quality--from the quality of the production of machines and equipment, consumer goods to the quality of training and instruction--was posed very seriously. Here I want to recall once again the problems connected with the quality of technology. If with the increase of the complexity of technical systems their reliability is not ensured, one will not have to envy our future generations. To live and work surrounded by unstable machines and to repair them day after day is not the best prospect. But, in addition, breakdowns of technical systems can also lead to major emergencies. It is not necessary to be a dreamer to imagine the results of the breakdown of the electric power supply system of a modern city or the breakdown of the control computers of large enterprises. These are losses in the millions and serious, or else fatal mishaps for thousands of people.

Under these conditions it is necessary to change our attitude toward machines. For modern "thinking" machines require much more skilled operation. It is already difficult today to imagine alongside industrial robots or other automatic machines self-styled "skilled craftsmen," who recognize as tools only a hammer and chisel or a sledge hammer and crowbar which weigh a little more. It is a question here not only of the increase of the skills of workers, technicians and engineers, but also of their full understanding of the role of these new machines in production of the future. The introduction of the versatile automated production system requires--and this is the primary thing--the education of a person with high moral and ethical qualities.

Technical progress is closely connected with the overall development of our society. The specialists, who are training and educating the new generation, should strive to give young people as full a picture of the modern world as



possible. Not in the sense of the complete presentation of the facts, but in the sense of a comprehensive explanation of the laws of development and the relations between the natural, human world and the artificial world created by people--including the world of technology.

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GENERAL

ROLE OF INNOVATORS IN SUCCESS OF 11TH FIVE-YEAR PLAN

Moscow PRAVDA in Russian 18 Jan 85 p 1

[Article: "Innovators and the Five-Year Plan"]

[Text] In fulfilling the state plans and socialist obligations for the final year of the five-year plan the labor collectives of every sector of the national economy in conformity with the instructions of the 26th CPSU Congress first of all are basing themselves on the improvement of the production potential and the development of the creative activeness of the masses and are creating the conditions for every worker for the efficient exertion of his powers, knowledge, skill and experience. "The distinguishing feature of the present moment consists," Comrade K. U. Chernenko noted at the meeting of the Politburo of the CPSU Central Committee, "in raising all work to a qualitatively higher level and in covering by rationalization all the links of the production process."

Production innovators--inventors and efficiency experts--are in the forefront of the labor collectives which are engaged in the improvement of workplaces, technology and the organization of labor. They are demonstrating daily by their creative work that the basis of the intensive development of the economy is the extensive use in production of scientific, technical, organizational and economic innovations.

The leading collectives of innovators of Moscow, Leningrad, Kiev, the Armenian SSR and the Belorussian SSR, Novosibirsk, Chelyabinsk and other oblasts are providing not less than a third of the above-plan increase of labor productivity as a result of the use of inventions and efficiency proposals. In Moscow alone this initiative received support at more than 400 enterprises and associations.

The organizations of the All-Union Society of Inventors and Efficiency Experts have appreciably stepped up their work. Many of them are now carrying out the more strict monitoring of the use in production of efficient innovations. Last year about 4,000 major inventions were under the public control of the organizations of the All-Union Society of Inventors and Efficiency Experts. Now the scale of control will be sharply expanded. An important part of the work of the councils of the All-Union Society of Inventors and Efficiency Experts is participation jointly with the USSR State Committee for Inventions

and Discoveries in the drafting of plans of the retooling of sectors and enterprises. Major developments, which were created on the basis of 193 major inventions, have been included in the plan of the final year of the five-year plan.

Innovative creative work has come to life at the associations and enterprises, which are conducting the economic experiment. For example, at the Miass Elektroapparat Plant they stimulate multiple-skill creative brigades without delay from the assets of the fund for the development of science and technology subject to the economic efficiency and the time of the introduction in production of the proposals of innovators. And such a system has animated the creative initiative of people.

At the same time the councils of the All-Union Society of Inventors and Efficiency Experts locally check on the average only about 10 percent of the major technical innovations which are being introduced in the corresponding regions. A unified system of the selection, planning and assimilation of innovations has not been set up. As a result as before a large gap remains between the number of generated and introduced proposals. For example, last year only a third of the inventions developed for the first time were used in the national economy.

Statistics show that efficiency proposals provide about two-thirds of the total economic impact from the introduction of innovations, while inventions account for barely more than a third of the total impact. But just major and important inventions, which have been used on a mass scale, make it possible to increase by several times the output of labor, to develop new generations of machines and to radically improve production technology.

A major shortcoming also lies in the fact that even well-developed innovations, which have been checked by experience, for years are not copied--they are used at only one plant. Some managers as in the past link the production of a new machine with the need for the construction of a new plant, although the operating shops are producing obsolete products and work one shift.

It is evident from the following example, to what this leads. It is well known that the share of manual labor in light industry is still large. In its cotton subsector alone more than 25,000 working women remove by hand the heavy packages of thread from the spilling machines. But at the Penza Scientific Production Association of Textile Machine Building on the basis of the use of five inventions it was possible to develop an automatic manipulator for the removal of the packages of thread. Back in 1975 it successfully underwent production tests and was recommended for production. But the Ministry of Machine Building for Light and Food Industry and Household Appliances has been working for 10 years on the question, at what plant to organize its mass production. In order to shorten the path of an innovation from the idea to the conveyor, the retooling and renovation of operating plants should be carried out more vigorously and obsolete products should be removed more rapidly from production.

Under present conditions not only is a sharp turn of science toward production necessary, but practice should also be more sensitive to the achievements of science. For the masses of any rank, for every labor collective the quick use of scientific, technical, economic and organizational innovations is an indicator of great political and civic maturity and evidence of a creative, promising approach to work. But, in addition to moral stimuli, material stimuli should also be in effect. Hence, the central economic departments need to develop effective stimuli for the enterprises which introduce inventions.

Now, when the production plans and the orders of consumers for the final year of the five-year plan have become law, their prompt fulfillment should be supported by reliance on new equipment and technology and the valuable developments of innovators. Every proposal, which speeds up work, increases production quality and decreases the consumption of energy and fuel, should be used without delay in production. Here the rapid dissemination of the best know-how, on the one hand, and the strict control of party committees and the holding of specific performers strictly accountable for inactivity, on the other, are needed. It is necessary to develop even more extensively the competition of collectives for the modernization of workplaces and their mass rationalization.

Under present conditions only highly productive equipment, which has been multiplied by a universal economic interest in its use, makes it possible to successfully hold a course of intensification and to successfully fulfill the assignments of the final year and the entire 11th Five-Year Plan.

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CSO: 1814/85



GENERAL

ACADEMICIAN BLOKHIN ON DEVELOPMENT OF MEDICAL ACADEMY

Moscow PRAVDA in Russian 3 Nov 84 p 3

[Article by President of the USSR Academy of Medical Sciences Academician N. Blokhin: "The Academy of Health"]

[Text] In 1944, when the war had not yet ceased to rage, the Soviet Government adopted the decision on the establishment of the USSR Academy of Medical Sciences. The thorough concern of the first socialist state in the world for the health of its citizens was thus again displayed. The establishment of the USSR Academy of Medical Sciences made it possible to conduct more actively research work in the area of medicine and health care.

In the past 40 years the scientists of the academy have achieved major gains in all areas of medical science. They have made a large contribution to the combating of a number of acute infections, natural focal diseases and tuberculosis, to the development of the most complicated operations on the brain, heart and vessels, to the study of the subtle mechanisms of the illnesses of man and to the improvement of their prevention and treatment. In our country small pox, malaria, polio and other dangerous illnesses were eradicated long ago. The services of medical scientists in this are unquestionable. On the initiative of Soviet scientists the World Health Organization organized work on the eradication of small pox in the world, and this task was successfully accomplished.

Long-range scientific programs have now been adopted and are being successfully implemented in the area of medicine. The most important ones of them have been elevated to the rank of state programs. Among such programs are the comprehensive studies on cardiology, oncology, pulmonary science, the health of mother and child, mental health, immunology, medical genetics and reconstructive plastic surgery. One of the most important ones is the disease prevention program, to which the USSR Academy of Medical Sciences is devoting, as is the USSR Ministry of Health, foremost attention.

In recent times scientific centers of the corresponding type have begun to be established for the concentration of efforts on the solution of major and difficult problems. The All-Union Oncology Scientific Center, the All-Union Surgery Scientific Center, the All-Union Cardiology Scientific Center and the All-Union Mental Health Scientific Center have appeared in the system of the

USSR Academy of Medical Sciences. Their construction was in reality national construction. For they were built with the assets obtained from All-Union Days of Voluntary Communist Labor. Life has shown that the organization of these centers was justified. Research at them is being conducted intensively, at a high level. Moreover, each such center is effectively coordinating the work in its field on the scale of the entire country.

In connection with the decree of the CPSU Central Committee and the USSR Council of Ministers "On the Further Development of Medical Science in the Regions of Siberia and the Far East" the Siberian Department of the USSR Academy of Medical Sciences was founded 5 years ago. The network of research medical institutions east of the Urals also grew. Owing to these measures Siberian and Far Eastern medical people have begun to provide significantly more scientific output, particularly information on adaptation, which is enabling man to adapt more quickly and easily to the unusual conditions and, hence, to develop better the new, economically valuable regions.

The scientific and technical revolution is making necessary the closer cooperation of medical people with physicists, chemists, biologists, mathematicians and representatives of technical disciplines. A joint session of the USSR Academy of Sciences and the USSR Academy of Medical Sciences, which decided to establish a permanent interacademy scientific council for problems of medicine, was held in 1980. President of the USSR Academy of Sciences Academician A. P. Aleksandrov headed this council. The new organization was able to provide an additional stimulus to much important research in medicine, enlisting in it representatives of other sciences.

Moreover, the Academy of Medical Sciences is broadening the direct contacts with the academies of sciences of the union republics. Plans and programs of joint scientific research, which are of substantial importance both for the improvement of health care in the corresponding regions and for the development of all Soviet medicine, are thus emerging.

It is impossible not say that in our times, when through the fault of the imperialist circles the international situation has become exceedingly strained, the role of medical people in the campaign for peace and for the prevention of nuclear war is great. More than 3 years ago the committee "Physicians for the Prevention of Nuclear War," which set itself the following tasks: the scientific medical study of nuclear strikes and the possible consequences of nuclear war in general and the extensive promotion of the campaign against this terrible danger, was set up at the USSR Academy of Medical Sciences. The academy held the All-Union Conference of Medical Personnel, which was devoted to this issue, and is actively participating in the activity of the international organization "International Physicians for the Prevention of Nuclear War."

The members of the academy are striving to do everything possible to protect the health of the current and future generations of Soviet people.

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GENERAL

UKRAINIAN PARTY ENDORSEMENT OF REPUBLIC ENGINEERING CENTERS

Kiev PRAVDA UKRAINY in Russian 17 Jan 85 p 1

[Article: "In the Central Committee of the Communist Party of the Ukraine"]

[Text] The Ukrainian CP Central Committee has considered the question of the work of the Ukrainian SSR Academy of Sciences on the organization of engineering centers.

In the decree it is noted that as a result of the purposeful creative search by the Presidium of the Ukrainian SSR Academy of Sciences, executives and party organizations of the scientific institutions for new effective forms of the contact of science and production and the speeding up of the engineering and technological embodiment of innovative developments problem-oriented subdivisions--engineering centers--have been established in the Ukrainian SSR Academy of Sciences.

Such centers are being formed on the basis of the academy's scientific and technical complexes for the preparation and organization of the introduction of fundamentally new developments, which were created on the basis of goal-oriented basic research and are of intersectorial importance. They unite the efforts of the scientific and design departments and the subdivisions of the pilot production base for the time of the solution of a specific problem and also work in close cooperation with scientific research, planning and design and production enterprises of interested sectors of industry.

At present in the Ukrainian SSR Academy of Sciences there are five engineering centers: three at the Institute of Electric Welding imeni Ye. O. Paton and one each at the Institute of Cybernetics imeni V. M. Glushkov and the Institute of Superhard Materials. The centers carry out design and technological operational development and the production of mockups of the latest equipment and prototypes of instruments and materials, analyze the needs of the sectors of industry for the corresponding developments and prepare proposals on the organization of the series production of innovations, draw up the documents necessary for this, give scientific, technical and consultative assistance to ministries, production associations and enterprises during the period of the assimilation and industrial use of new equipment and technology and carry out the training of specialists of the corresponding type for the sectors of industry.

The establishment of the engineering centers is making it possible to shorten significantly the time of the development and introduction in production of a number of materials, technologies and equipment, which do not have analogues in domestic and world practice and make it possible to increase labor productivity, the quality of items, the reliability and performance of the assemblies of domestic designs and structures and to decrease the materials-output ratio.

The Ukrainian CP Central Committee approved of the work of the Ukrainian SSR Academy of Sciences on the establishment of engineering centers as a new highly efficient form of the contact of science and production.

The Commission of the Presidium of the Ukrainian SSR Council of Ministers for Questions of Scientific and Technical Progress, the Ukrainian SSR State Planning Committee, the Ukrainian SSR Academy of Sciences and the Ukrainian SSR Ministry of Higher and Secondary Specialized Education were commissioned during the first half of 1985 to examine the questions connected with the dissemination of this know-how and to specify the scientific institutions, on the basis of which it is advisable to establish engineering centers, first of all for the solution of the key problems of machine building, power engineering, construction and the automation of production.

The suggestion of the Ukrainian SSR State Committee for Material and Technical Supply and the Ukrainian SSR Academy of Sciences on the establishment of engineering centers for the organization of the extensive introduction of the achievements of science and technology for the purpose of solving the problems of preparing metal products for consumption in production and the efficient use of secondary resources was supported.

The Ukrainian SSR Academy of Sciences, the Ukrainian SSR State Committee for Labor and the Ukrainian SSR Ministry of Finance were commissioned to prepare and to submit to the Ukrainian SSR Council of Ministers and the appropriate union organs suggestions on the solution of the problems, which are connected with the organization of engineering centers and the assurance of their most efficient activity.

Steps on the monitoring of the dissemination and development of the experience of this work were specified.

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GENERAL

VACANCIES IN UKRAINIAN SSR ACADEMY OF SCIENCES ANNOUNCED

Kiev PRAVDA UKRAINY in Russian 19 Jan 85 p 3

[Article: "From the Ukrainian SSR Academy of Sciences"]

[Text] The Ukrainian SSR Academy of Sciences, in conformity with Paragraphs 19 and 20 of its charter, hereby announces the available vacancies of full members (academicians) of the Ukrainian SSR Academy of Sciences and corresponding members of the Ukrainian SSR Academy of Sciences in the following specialties:

	Academicians	Corresponding members
Mathematics and Cybernetics Department		
Mathematics	1	2
Mechanics Department		
Machine building	1	-
Mechanics	-	1
Explosion mechanics, geodynamics	-	1
Physics and Astronomy Department		
Astronomy	1	-
Physics	1	-
Experimental solid-state physics	-	1
Microwave electronics	-	1
Earth Sciences Department		
Geology, geophysics	-	1

#### Physical and Technical Problems of Materials Science Department

Materials science, metals technology	1	-
Materials science	-	2
Materials science, technology of thermoelectric materials	-	1

#### Physical and Technical Problems of Power Engineering Department

Power machine building, durability of machines	1	-
Heat and power engineering	-	1
Electrical engineering and electronic modeling	-	2

#### Chemistry and Chemical Technology Department

Organic chemistry	1	-
Physical chemistry	1	-
Chemical technology, inorganic materials	-	1

#### Biochemistry, Physiology and Theoretical Medicine Department

Molecular biology	1	-
Virology and microbiology	1	-
Physical chemical biology of membranes	-	1

#### General Biology Department

Cell engineering of plants	-	1
Genetics, experimental mutagenesis	-	1
Entomology	-	1

#### Economics Department

Economics of the agroindustrial complex	-	1
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#### History, Philosophy and Law Department

History of the USSR	1	-
General history	-	1
Philosophy	1	-
Philosophy, atheism	-	1
Law	-	1

#### Literature, Linguistics and Art Department

Literary criticism	1	-
Linguistics	1	-

In accordance with Paragraph 14 of the charter of the Ukrainian SSR Academy of Sciences, scientists, who have enriched science with works of vital scientific importance, are elected full members (academicians) of the Ukrainian SSR Academy of Sciences.

In accordance with Paragraph 15 of the charter of the Ukrainian SSR Academy of Sciences, scientists, who have enriched science with outstanding works, are elected corresponding members of the Ukrainian SSR Academy of Sciences.

The right within 1 month from the day of publication to report in writing to the Ukrainian SSR Academy of Sciences with the corresponding explanation the names of candidates for full members and corresponding members of the Ukrainian SSR Academy of Sciences in the specialties indicated in this publication is granted to the councils of scientific institutions and higher educational institutions, state and public organizations, full members and corresponding members of the academies of sciences (Paragraph 21 of the charter). The nomination of candidates by scientific institutions, higher educational institutions, state and public organizations is carried out at the meetings of the academic and scientific and technical councils of the collegiums or presidiums by a show of hands.

When reporting the names of the candidates for full members and corresponding members of the Ukrainian SSR Academy of Sciences, it is necessary to enclose the following documents (in two copies): the representation (decision) of the council, state and public organizations or a letter with the appropriate explanation in case of the nomination of a candidate by full members and corresponding members of the academies of sciences, an autobiography, a personal job registration certificate with a 4.5 X 6 cm photograph, a description of the public and production activity of the candidate from the basic place of work, a copy of the diploma on graduation from a higher educational institution, copies of the diplomas on the conferment of an academic degree and title, a list of scientific works (form 2.3) and reviews on their importance for the building of communism in the USSR.

In case of the failure to submit any of the documents indicated above the candidate cannot be registered.

Send all the materials to the address: 252601, Kiev-30, GSP, Ulitsa Vladimirska, 54, the Ukrainian SSR Academy of Sciences.

The Presidium of the Ukrainian SSR Academy of Sciences

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GENERAL

ALIYEV ADDRESSES MEDICAL SCIENCE ACADEMY

Moscow PRAVDA in Russian 15 Dec 84 p 3

[TASS report: "Protecting the Health of Soviet People"]

[Text] One of the greatest gains of the socialist system is the Soviet health service. Concern for the people's health has been raised to the rank of state policy in our country. The USSR Academy of Medical Sciences makes a great contribution to protecting Soviet people from disease and ensuring conditions for an active and full life.

A ceremonial meeting was held 14 December in the House of Unions' Hall of Columns to mark the presentation of the Order of Lenin to the academy. It has been awarded this lofty title for great services in the development of medical science and public health care.

An honorary presidium was enthusiastically elected comprising the CPSU Central Committee Politburo headed by Comrade K. U. Chernenko.

G. A. Aliyev, who was warmly greeted by those present, delivered a speech at the meeting. On behalf of the CPSU Central Committee, the USSR Supreme Soviet Presidium, and the USSR Council of Ministers, he cordially congratulated the collective of the Academy of Medical Sciences and all who protect Soviet people's health on the conferment of the motherland's lofty award.

It is with special satisfaction, the speaker said, that I convey to you--and through you to the more than 6-million-strong detachment of Soviet medical science and health care workers--warm congratulations and wishes for new scientific achievements and new successes in protecting and improving our people's health from K. U. Chernenko, general secretary of the CPSU Central Committee and chairman of the USSR Supreme Soviet Presidium. You know full well what tremendous attention Konstantin Ustinovich pays to developing health care and improving Soviet people's material and spiritual life. On his initiative a whole range of important documents has been adopted concerning the further improvement of all national economic activity and intensifying the social thrust of our plans even more. This is cogent proof that concern for the working person was and still is the most important concern of Lenin's party.



The USSR Academy of Medical Sciences, founded in 1944 when the volleys of the Great Patriotic War were still sounding, G. A. Aliyev continued, has traveled a great and glorious road in a historically short space of time and become one of the most powerful centers of medical thought in the world. And the awarding of the Order of Lenin to the academy constitutes nationwide recognition of its services and its supreme scientific prestige. It is also confirmation of the achievements of socialist society in the exceptionally complex and important cause of protecting the health of the country's entire population.

From the first days of the victory of the revolution medical science and the developing Soviet health care system were effective factors in consolidating revolutionary gains and educating physically and morally healthy generations of builders of the new world. The foundation of the academy was the logical result of the development of Soviet health care in both the theoretical and the practical spheres. It was a worthy legacy of the progressive traditions of Russian and national medicine.

The search for new methods of the prevention and treatment of diseases on the broad basis of a synthesis of the natural, technical, and social sciences and the art of healing--an approach based on Marxist-Leninist dialectic method--was made the foundation of all the academy's activity. It has become the headquarters of scientific thinking, accumulating and generalizing the results of work in all spheres of medicine.

The academy has made a significant contribution not just to the development of Soviet medical thinking but also to the fashioning of the typical Soviet medical scientist, a doctor and representative of the real people's intelligentsia. In his devotion to the cause of October, a Marxist-Leninist world view, and logically professionalism are organically combined with ardent patriotism and internationalism and selfless love for the people, expressed in the persistent, frequently heroic, and--in the terrible war years--fatally dangerous labor of several generations of Soviet doctors now.

At all the stages of development of Soviet society medical scientists have been in step with the times. Conducting topical fundamental development work and actively responding to the needs of practical health care, they have enriched and brought fame to Soviet science with new discoveries. A completely new sphere of science--space medicine--has also been born.

The considerable social achievements which profoundly reveal the humane essence of our system--the striking improvement of health of Soviet people representing all the nations and ethnic groups and all groups of the USSR's population, and Soviet people's longevity, which has increased on the whole--would have been impossible without the active participation of medical science.

Dwelling on the special features of the present stage of development of medical science, the speaker noted specially the significance of a fundamentally new form of medical aid--the specialized medical services--and stressed the scale of the academy's activity, which has encompassed the whole country. Tasks of great social significance are being tackled, in particular

by scientists of the Siberian Department of the USSR Academy of Medical Sciences. Together with medical scientists of other regions they are elaborating scientific fundamentals for the medical and hygienic provision of regions of Siberia, the Far East, and the Far North which have already proved their effectiveness in the Baykal-Amur Railway Line construction zone.

The importance of strengthening ties between scientists and labor collectives is great. The implementation at enterprises of programs which actively promote health care and the improvement of working conditions shows yet again that for socialist society man and working people are not merely the chief productive force but also the chief asset.

Our society is proud that Soviet medical scientists are making a major contribution to the development of world sciences and are at the forefront of the struggle against disease.

Our medical science and the USSR Academy of Medical Sciences are carrying out particularly close and diverse cooperation with socialist countries' scientists. The broadest prospects are opened up in this direction by the implementation of the accords of the CEMA Economic Summit Conference.

Dwelling on the tasks facing medical science and Soviet health care as a whole, the speaker declared that they are inseparable from the concerns and plans by which the Communist Party and the entire Soviet people live. The whole life of our society is currently proceeding under the mobilizing force of the decisions of the CPSU Central Committee February, April and October (1984) plenums and the speeches of Comrade K. U. Chernenko. A new surge of mass creative energy aimed at successfully implementing the projected plans and creating a good foundation for the future was evoked by Konstantin Ustinovich's policy speech at the CPSU Central Committee Politburo session.

The fact that the country has embarked on a period of active preparation for the 27th CPSU Congress, at which a document of tremendous theoretical and political importance--a new edition of the Party Program--will be submitted for discussion, imparts special political thrust to our diverse and multifaceted work, G. A. Aliyev stressed. It can be said with every justification that the tasks set by the 26th party congress in the sphere of Soviet people's health care are being fulfilled on the whole. The decisions of the CPSU Central Committee June (1983) Plenum, which defined specific directions for the all-around improvement of Soviet health care, played a fundamental role in this respect. The full provision of the right to health care guaranteed by the Constitution the all-embracing satisfaction of Soviet people's needs in all branches of medical aid and preventive services, and the prolongation of active life are society's chief social instruction to medical scientists and the whole system of Soviet health care today.

At the same time the speaker noted that the standard of medical aid still does not always meet the growing requirements of Soviet people. In particular, the work of medical establishments is in need of considerable improvement and the reduction of the sickness rate entailing temporary loss of working fitness remains an important task. The problems of further increasing longevity, reducing cardiovascular disease, improving the health of the rising

generation, and introducing more sophisticated methods of early diagnosis and treatment require the united efforts of medical science, health care organs, and other social institutions. The elaboration of fundamental questions of theory, methodology, and sociology must be raised to a considerably higher level.

The main way to solve these problems is to intensify scientific research and the operation of the whole system of health care, to improve its quality, to accelerate the introduction of the achievements of science and technology, and primarily to make rational use of what we already have at our disposal. More effective use must be made of every ruble and every public kopeck invested in the vitally important sphere of public health care.

The fundamental principle of health care in a socialist society is prevention. The task set by the party of the gradual introduction of an annual medical examination for the whole population is bound to serve this goal effectively. The basis and foundation for the implementation of this exceptionally serious social and political measure must be purposeful developmental research and recommendations by scientists.

The concept of socialist civilization entails--as well as a person's general culture--a high degree of physical culture and hygienic standard. This includes rational organization of leisure, a scientifically substantiated diet system, the fashioning of judicious requirements, and the habit of treating health--to use Lenin's apt expression--as "state property," that is, as a particularly valuable social asset. Thought must also be given to seriously improving medical propaganda.

The acceleration of scientific and technical progress, which is one of the most important tasks of the day, the speaker continued, is a complex problem requiring the efforts of all the fundamental and applied sciences. A joint investigative quest by scientists of the most varied specialties is particularly important of progress in medicine. For the knowledge which doctors possess and everything that is introduced into the treasure house of the science of life by biologists, physiologists, chemists, cybernetic scientists, and philosophers--all this is ultimately intended for man, for the preservation and improvement of his health and the consolidation of his well-being. In this connection the interaction between the two academies--the USSR Academy of Sciences and the Academy of Medical Sciences, aimed at developing new preparations and technologies and further utilizing the achievements of the fundamental sciences in medical practice, assumes ever increasing significance and deserves all possible support.

Whatever the sort of doctor, it is always a question of treating not just an illness, but primarily a person. Against the background of the selflessness of hundreds of thousands of our doctors, the instances of violations of professional duty by medical workers and other negative phenomena which are still encountered are particularly disagreeable. In this connection G. A. Aliyev stressed the great importance in training health care cadres and educating future doctors of the personal example and moral makeup of the mentor--scientist, educator, or hospital or medical center leader.



It is the prime official and civic duty of all health care workers to sacredly prize people's respect and the medical worker's honor and to augment medicine's services to the people.

Going on to analyze the contemporary international situation, which has deteriorated dangerously though the fault of U.S. imperialist circles, the speaker described the active, assertive, and peace-loving foreign policy of the Communist Party and the Soviet state and stressed the great significance of the new constructive Soviet initiatives aimed at not just halting but also turning back the arms race and guaranteeing people of all countries the opportunity of living and working in peace.

The situation which has taken shape in the modern world urgently requires an active contribution by all progressive, democratic, and peace-loving forces to the cause of averting the threat of war and defending the peoples' peace and security. Progressive medical figures--participants in the "International Physicians for the Prevention of Nuclear War" movement--are in the forefront of the public's antiwar demonstrations. Its very humane activity was highly appraised in Comrade K. U. Chernenko's recent reply to the appeal by the movement's fourth congress. Representatives of Soviet medical science and all our health care workers play a great role in this movement.

The ancient Hippocratic oath is assuming a new dimension in our day and being supplemented with a pledge to oppose the nuclear threat to the utmost. The Soviet Union is the first country where such an addition has been introduced into the doctor's oath. Over 1 million Soviet doctors have signed an appeal to halt the nuclear arms race. There is no doubt that the voice of Soviet scientists and doctors and the voice of the USSR Academy of Medical Sciences will continue to sound loudly in the powerful protest of all honest people in the world against the fueling of international tension by the forces of imperialism and against the threat of war.

G. A. Aliyev read out the USSR Supreme Soviet Presidium decree and, to the accompaniment of the tumultuous applause of those assembled, fixed the Order of Lenin to the academy's banner.

On behalf of the medical scientists, President of the USSR Academy of Medical Sciences N. N. Blokhin expressed profound gratitude to the CPSU Central Committee, the USSR Supreme Soviet Presidium, the Soviet Government, and Comrade K. U. Chernenko for the lofty award.

S. P. Burenko, USSR minister of health; A. P. Aleksandrov, president of the USSR Academy of Sciences; N. Z. Milashchenko, first vice president of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin; and M. I. Kondakov, president of the USSR Academy of Pedagogical Sciences, greeted the collective of the Academy of Medical Sciences.

The meeting participants sent a greetings letter to the CPSU Central Committee, the USSR Supreme Soviet Presidium, and the USSR Council of Ministers.



GENERAL

BRIEFS

NEW JOURNAL--On 7 January the first issue of the new periodical of the All-Union Society for Knowledge NTR: PROBLEMY I RESHENIYA is being published. Its basic goal is the promotion of the latest achievements of Soviet and foreign science and technology. To interest those who are directly involved in the introduction of the achievements of science and technology in practice and to help specialists of various fields of knowledge in the sharing of useful information are the tasks of the newly founded periodical. The first issue opens with a notice to the reader of the editorial council, of which prominent Soviet scientists and organizers of science are members. The reader will acquaint himself with the article of Academician D. Gvishiani "The Command of the Times" on the global problems facing mankind. NTR: PROBLEMY I RESHENIYA will be delivered to subscribers and the kiosks of the Main Administration for the Distribution of Printed Matter twice a month. [Text] [Moscow IZVESTIYA in Russian 5 Jan 85 p 6] 7807

UKRAINIAN ENGINEERING CENTERS--The Ukrainian CP Central Committee has considered the question of the work of the Ukrainian SSR Academy of Sciences on the organization of engineering centers. In the decree it is noted that as a result of the purposeful creative search by the Presidium of the Ukrainian SSR Academy of Sciences, executives and party organizations of the scientific institutions new effective forms of the contact of science and production and the speeding up of the introduction of innovative developments have been found. Five engineering centers have been established at the republic Academy of Sciences. PRAVDA told about their work on 3 January of this year. The Ukrainian CP Central Committee approved of the activity of the Ukrainian SSR Academy of Sciences on the establishment of engineering centers as a new highly effective form of the contact of science and production. The corresponding departments and organizations were commissioned to consider the questions connected with the dissemination of this know-how and to specify the scientific institutions, on the basis of which it is advisable to establish such centers, first of all for the solution of the key problems of machine building, power engineering, construction and the automation of production. [By PRAVDA correspondent M. Odinets] [Text] [Moscow PRAVDA in Russian 18 Jan 85 p 3] 7807

LATVIAN SCIENTIFIC COOPERATION--LATINFORM--The Presidium of the Latvian SSR Academy of Sciences and the Presidium of the Latvian Republic Council of Scientific and Technical Societies discussed on 24 January at their joint

meeting the question of the strengthening of mutual creative ties. It was noted that the close connection of workers of science and production is of great importance for the quickest introduction of scientific results in the national economy and the assurance of a high growth rate of labor productivity. The institutes, enterprises and scientific councils of the Latvian SSR Academy of Sciences and the organizations of the scientific and technical societies of the republic in recent years have broadened mutual contacts, which contributed to the increase of the number of developments introduced in the national economy. The meeting participants stressed the importance of stepping up even more mutual cooperation in the accomplishment of the tasks, which were posed by the party on the acceleration of the rate of scientific and technical progress and the strengthening of the contact of science with production. For this it is planned to organize the public monitoring of the introduction of the most important scientific developments for the national economy and to implement a number of other measures. Specific steps on the strengthening of the creative ties of the workers of science and production are outlined in the adopted decree. [Text] [Riga SOVETSKAYA LATVIYA in Russian 25 Jan 85 p 2] 7807

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